49 NEW PRODUCTS—PAGE 201 ▪ 24 PRODUCT REVIEWS—PAGE 152

MACWORLD

The Macintosh® Magazine

April 1989 $3.95
Canada $4.95

New! Mac IIcx

In-Depth Coverage of Apple's New Mac

PageMaker, QuarkXpress & ReadySetGo: How They Compare

Statistics Software

Music for Beginners

Moving PC Files to the Mac

Ten Techniques for Speed

True Macintosh
Microsoft acro

Editor's Corner

By B. R. Ross

mike
This is what I've been talking about
It's HOT!!
-P

Fasten your seatbelts, Mac® fans. You're about to enter the Microsoft Zone.

Earlier this week I witnessed a demo of Microsoft's products that left me feeling as enlightened as the day I first set my eyes on a Macintosh®.

Here's a company with a reputation for singularly superior products. But what they showed me pushed the envelope of software productivity:

A complete line of products for the Mac that *all work together*.

The significance of which hit me like a ton of bricks when I saw them in action.

For instance, I saw a chart in your very favorite spreadsheet and mine, Microsoft® Excel, updated from within Microsoft Word 4.0 using just a few keystrokes. And then pasted into PowerPoint® for an incredible looking presentation.

And with just as little effort, the ever-capable Microsoft Word 4.0 was merged with Microsoft's database application, File, for a mass mailing.

As if that wasn't enough, I saw their versatile integrated program Works share files with Microsoft Excel and Word.

What really blew me away is Microsoft Mail. You can send and receive information between members in your workgroup even if they're on a PC. Nice.

But the real beauty is that you can access Microsoft Mail directly from the File menu when you're in Microsoft Word 4.0. No other company can offer that kind of integration. Or this kind:

A product line that all works together. With other applications on the Mac. And even with such PC standards like Lotus® 1-2-3®, Microsoft Word 5.0 and WordPerfect®.

What's more, every product is supported by on-line help and a comprehensive manual. Or you can call one number for unlimited technical support.

Here's a company with a reputation for singularly superior products. But what they showed me pushed the envelope of software productivity: A complete line of products that all work together.

Obviously, I'm impressed. So much so, that I've asked Microsoft to send copies of their Macintosh product line brochure in time for our next meeting. If you can't make it, you can always get a free copy by calling (800) 541-1261, Dept. I92.

Fellow Macphiles, man your Macs. Because we're entering a new age of compatibility—or at least Microsoft is.

And I don't know about you, but I plan on going along for the ride.

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The Macintosh® Magazine

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A compact version of the Mac IIx, the Mac IIcx has fewer slots but all the power of its bigger brother (page 130). (Photo by Fred Stimson.)

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▪ *Beyond HyperCard* Two companies prepare more powerful HyperCard clones.

▪ *New MacWrite and MacDraw* In addition to new versions of the old standbys, Claris introduces Claris CAD and the SmartForm Series.

▪ *And Now Presenting...* PowerPoint and More II connect to slide-making services for quick turnaround.

▪ *E-Mail Support Grows on Vines* A Mac electronic-mail gateway links VINES Network Mail and QuickMail.

▪ *TokaMack* Columbia University uses a Mac program in fusion research.

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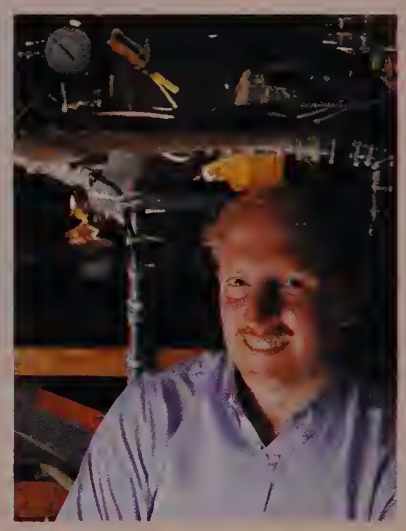
Speed reading, taxes, and more.



The Mac helps scientists search for safer nuclear energy. See Macworld News *(page 81).*

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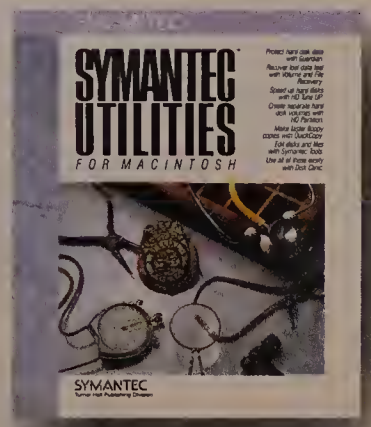

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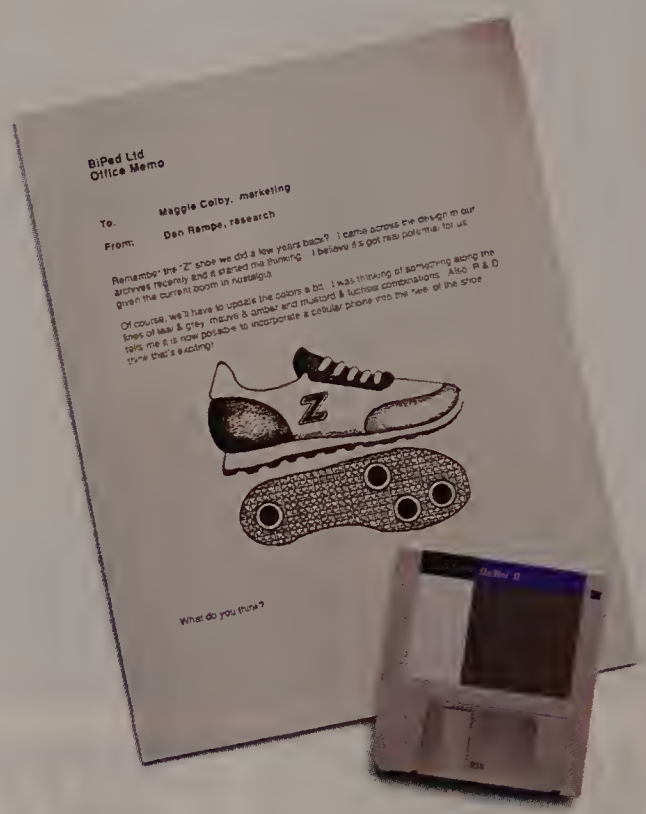

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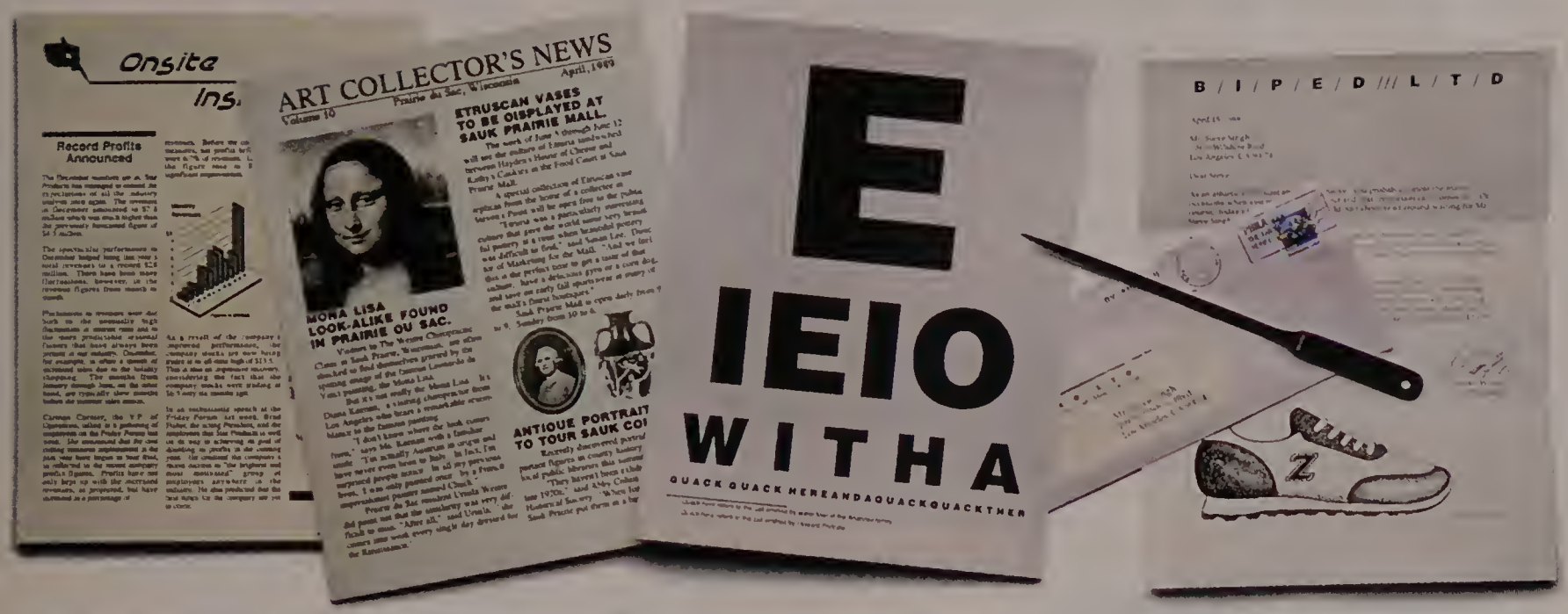

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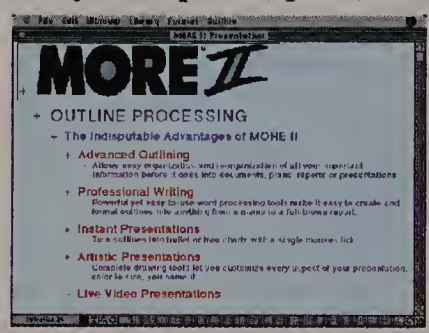

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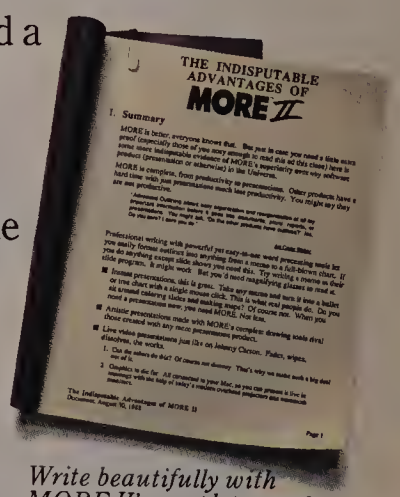

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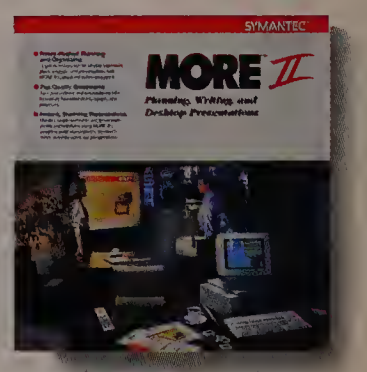

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HP PaintJet for the Mac

▶ Hewlett-Packard now offers an interface kit to make Mac Pluses, SEs, and IIs work with the HP PaintJet color graphics printer. The kit lets the printer run with QuickDraw-based Mac software, including MacDraw II, Microsoft Word 3.02, Excel 1.5, PowerPoint, and Cricket Presents.

With the kit, the HP PaintJet printer supports 256 colors on the Mac II and 8 colors on the Mac SE and Plus. Depending on the software, users can mix colors to get thousands of shades and hues.

The HP PaintJet printer produces 180 dots-per-inch and prints near-letter-quality text at 167 characters per second. A typical page prints in 30 to 40 seconds. The kit provides bit-mapped printer fonts in sizes from 10-point to 36-point and in Times, Helvetica, Courier, and Symbol fonts. For further information, contact Hewlett-Packard Peripherals Group at 619/592-4676.

Crate Hard Drives

▶ Crate Technology is manufacturing eight new hard drives, including ToteCrate, a removable drive for Macintosh users who work with classified or sensitive data. ToteCrate features a 45MB removable data cartridge. The other seven drives are a 40MB InnerCrate internal disk drive for the Mac SE; 100MB and 160MB InnerCrate internal disk drives; 100MB and 160MB MacCrate external disk drives for the SE and the II; and upgraded 300MB and 600MB InnerCrate internal disk drives for the II. Crate drives are sold through distributors and dealers and directly to government offices, educational institutions, and the Fortune 500. For further information, contact Crate Technology at 213/822-4669.

New Printing Options

▶ Laser Connection, a QMS subsidiary, is offering three new printing products. First is the new version of MacJet software, which lets Macintosh users print directly to all HP LaserJet series, and compatible, printers. It works with the 512K Mac and up, and it lists for $249.

Second is the SX Envelope Cassette Tray, an automatic-feed tray that holds up to 15 envelopes and fits into the paper cassette slot of all Canon SX-based printers, including QMS Kissplus, QMS-PS 810, HP LaserJet Series II, and Apple LaserWriter II printers. It lists for $85.

Third is the BigBin 1000, a motorized paper input tray that lets Apple LaserWriter IISC, NT, and NTX printers hold 1000 sheets of letter-size paper, five times more than the standard paper cassette. The company also has versions for Canon SX–, Ricoh 4150–, and Ricoh 4080/4081–based laser printers. All BigBin 1000 versions list for $795. For further information, contact Laser Connection at 205/633-7223.

Virex Update

▶ HJC Software has updated Virex, its antivirus program for the Mac, to combat two new viruses reported by Virex users. The first is an entirely new and different Mac virus that infects disks the instant they are inserted into an infected computer. It infects programs by inserting INIT 29 resources, so it has been named the INIT29 virus.

The second virus is a derivative of the nVIR family of viruses, with two minor variations that help it escape detection by previous antivirus software. It is called the Hpat virus because it replaces nVIR resources with Hpat resources.

Virex lists for $99.95. Registered users will be notified and offered an update for $15. For further information, contact HJC Software at 919/490-1277.

84MB Drive from PCPC

▶ Personal Computer Peripherals Corporation (PCPC) has announced an addition to its line of MacBottom SCSI hard disks for the Mac Plus, SE, and II. The new MacBottom HD84 offers a formatted storage capacity of 84MB. The new drive combines a 19-millisecond average access time, an interleaf ratio of 1:1, and a track cache. The track cache tries to calculate what the next request for data will be and stores that data in memory on the drive's controller board.

The HD84 comes fully formatted and includes PCPC's popular HFS Backup 3.0 and other disk utilities. An internal, Hayes-compatible 300/1200-baud modem is optional. For further information, contact PCPC at 813/884-3092.

In-CAD

▶ Infinite Graphics has been hard at work on its In-Vision family of advanced CAD/CAM software for the Mac. In-CAD, the first package available, provides both 3-D solids modeling and 2-D drafting capabilities. Traditionally, these two functions are sold as individual programs and often don't even share the same user interface.

In-CAD contains a true Constructive Solid Geometry (CSG)–based modeling program and thus provides a more complete object model than can be achieved with wire-frame or surface modelers. Building-block primitives and Boolean operations are used to add and subtract material, and the resulting model may be viewed from any direction with hidden lines removed, shaded, or sectioned.

(continues)

In-CAD also has a translator specifically for AutoCAD DXF files, full geometry creation and editing, a user programming language, a WYSIWYG interface, and an IGES translator for importing and exporting files between other CAD systems.

In-CAD operates on the Mac II only and lists for $1945. For further information, contact Infinite Graphics at 612/721-6283.

Hot Presentations

▶ General Parametrics Corporation, a leader in desktop presentation products for the IBM PC, has entered the Mac market with three models of its VideoShow Desktop Presentation System. Each model produces and shows slides, transparencies, overheads, and handouts. The portable presentation units can be connected to any color monitor or large screen video projector. You operate them with wireless, hand-held remote-control units and choose between a broad spectrum of special effects such as fades, wipes, spirals, weaves, and an on-screen pointer.

The top of the VideoShow line is the VideoShow Professional, retailing for $8995. The VideoShow Executive retails for $2695 and the VideoShow Companion for $1795. For further information, contact General Parametrics at 415/524-3950.

Apple Lowers SE/30 Prices

▶ Apple has reduced its SE/30 prices and has changed the system's configurations, in part due to the unpopularity of last fall's price hikes. Now at the low-end is the SE/30 with 1MB of RAM and an FDHD floppy drive for $4500. The low-end hard disk configuration includes 1MB of RAM, an internal 40MB hard disk, an FDHD, and a keyboard, all for $5000. At the high end, you get 4MB of RAM, an internal 80MB hard disk, and an FDHD for $6500 to $6700. For further information, contact Apple Computer at 415/996-1010.

NEC's Printer

▶ NEC Information Systems has introduced the Silentwriter LC 890XL PostScript page printer, featuring the new 68020-based Atlas controller from Adobe Systems. The printer comes with 4MB of RAM that is expandable to 8MB, and offers an external 20MB hard disk option. The 20MB disk lets users cache large numbers of fonts and overlays.

The LC 890XL uses LED-array technology and has a rated print speed of 8 pages-per-minute. It includes 35 resident typefonts and accepts downloadable fonts from Adobe. Other features include emulation of HP LaserJet II series and Diablo 630 ECS; Centronics parallel, RS-232C serial, and RS-422 AppleTalk interfaces; and two 250-sheet input hoppers.

The LC 890XL lists for $6995. The optional 20MB hard disk costs $999. The printer was scheduled to ship in March. For more information, contact NEC Information Systems at 508/264-8000.

MacDot Printer

▶ Advanced Matrix Technology (AMT) has introduced the MacDot printer to compete with the Apple ImageWriter LQ and ImageWriter II printers. The first 24-wire printer for the Macintosh, MacDot prints draft-quality pages at 480 characters per second, provides a variety of graphics resolutions, and prints text from 5 to 20 pitch. Text attributes include bold, shadow, italics, underline, proportional, and superscript. Fonts include Courier, Gothic, Trend, and Elite.

MacDot prints both text and graphics in either black and white or full color. For further information, contact AMT at 800/992-2264.

Sony, Pinnacle Ship Erasable Optical Drives

▶ Considered to represent a new generation in storage, magneto-optical disk technology (the storage technology used in the Canon drive announced for Steve Jobs's Next computer) has arrived for the Macintosh. Sony Corporation says it has begun shipping magneto-optical drives to Pinnacle Micro of Irvine, California, which is incorporating them in its recently introduced 650MB removable, erasable disk system, the REO-650. The erasable optical drive attaches to the Mac's SCSI port. Removable 650MB disks cost $230 each; the REO-650 lists for $5995. Pinnacle will also offer a two-drive unit, the REO-1350. For more information, call Pinnacle at 714/727-3300.

Network Server from Jasmine

▶ Jasmine Technologies has rolled out DirectServe, a combination of software and external hardware that provides faster, cheaper AppleShare networking than setups based on a dedicated Macintosh. DirectServe is built around a 68000 chip, includes AppleShare code in ROM, and comes with 1MB of RAM (expandable to 4MB). Data caching increases Direct-Serve's performance. Network cost per node is projected to be about half that of a traditional AppleShare network. DirectServe, slated to ship in February, will cost $1299. For more information, call Jasmine at 415/282-1111.

New WriteNow Now

▶ T/Maker is shipping WriteNow version 2.0, which includes over 50 new features, including three dictionaries (large, small, and user-created), character/word/paragraph count, smart quotes, mail merge, and direct importing and exporting of RTF (rich text format) and MacWrite files. WriteNow 2.0 is now compatible with MultiFinder, the Apple Extended Keyboard, AppleShare, TOPS, and other networking systems. It comes on two 800K disks; one disk is optimized for use on single-floppy-drive systems.

WriteNow 2.0 has a list price of $195; registered owners who bought version 1.0 after January 15, 1988, will receive the upgrade free. For more information, contact T/Maker at 415/962-0195. □

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Share most serial devices over LocalTalk.	✓	
Change volume size without reinitializing.	✓	
Create file volumes on a fragmented disk.	✓	
Software compacts & defragmentizes files.	✓	
Software includes read, write & seek tests.	✓	
Software selection of the interleave factor.	✓	
Password protect and write-lock volumes.	✓	
Link up to 7 drives into one large volume.	✓	
Volumes support UNIX and other systems.	✓	
Drive compatible with accelerated systems.	✓	
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Macworld Expo—San Francisco

An overview of new products

When things become too big, we tend to gloss over them (remember "billions and billions of stars?). Engineers and software programmers have a name for this syndrome. When they come to the part where the code isn't written yet or the ideas aren't fixed, they like to say "hand wave," referring to all the gesticulation that normally accompanies things we can't describe. The Macworld Expo has become so big an event—more than 50,000 attendees—that people are wont to say, "you know, there just isn't anything exciting at the Expo anymore." What they're really saying is that there's too much to comprehend, too many hundreds of new products to put it all into some understandable, comprehendible, get-your-hands-around-it-and-call-it-one-cute-thing form. But I'm going to try.

For four days I walked the floors of the Macworld Expo's two locations: San Francisco's gleaming convention hall, Moscone Center, and the tattered old Civic Auditorium. I think I stopped at every booth and asked what was new—but I wouldn't want to swear that I saw everything. Because I spent nearly all my time on the show floor, I certainly didn't see all of next summer's products being shown in the hospitality suites off the show floor. I've since heard that there was some really neat stuff outside of the show—hand wave.

Mac SE/30

Apple announced its 68030 in a Macintosh chassis with the host of great features we discussed in our March issue. What's most important about the announcement for me is that it shows Apple is keeping its promise to launch a steady stream of product—will not only to the continued growth of the third-party products that we all love, but also to the long-term competitiveness of Apple Computer. Now for about $5,000 we can buy a small computer from Apple that competes with anything other vendors can produce—the low- to mid-range machines from Sun and Apollo, for instance, not to mention the 386 family of machines. Sure, if you run some benchmarks on one of the fast Compaq machines you'll see that it competes with the SE/30, but to choose the Compaq over the SE/30 you'll have to ignore the SE/30's better interface, networking, software, and so forth. And the fact that you can easily add a large-screen monitor (that will perform better than it would on the original SE due to a change in the connection to the system board) gives new Macintosh purchasers a reason to spend the extra money for the SE/30. Not that engineers, programmers, and anyone who can actually make use of A/UX or floating-point math-based applications will hesitate. This is another dream machine for those who don't need the expandability of the Mac II.

Accelerators

Is there no end to demands for computing power? No. There are many out there who want faster machines. In fact, an accelerator for the SE/30 was announced the day Apple announced the new machine. Good news for owners of all machines, from the Mac 128K to the Mac II, is the large number of accelerators available for these machines. Spectra's Procard and Total Systems's Gemini, for example, will change your 128K Mac to a Motorola 68020—based machine that rivals the speed of the Mac II (you worry about finding the SCSI interface). And for Mac SE and II owners, there are new 030 or 040 accelerators from DayStar, Dove, SuClone, Ann, Mirage, CSA, and Irwin. Of course, Apple also offers an upgrade for the Mac II and SE, so keep in mind the traditional trade-offs: the security you get with an Apple product versus the features and lower cost typical of a third-party offering. DPI offers a $269 upgrade for the Mac Plus.

Performance

How to get greater speed from the Mac was one of the major themes at the show. Disk and memory access are crucial to speed on the Mac (see "Ten Ways to Speed Up a Mac," in this issue), and many vendors are responding to demands for speed. RAM cache boards are available from Furnace Micro, Jem Cybernetics, Golden Triangle, Orchid, and National Semiconductor. The RAM cache is high-speed RAM that allows the CPU to speed up data handling; the DMA boards speed the flow of data from your hard disk to the processor. National Semiconductor was also showing a brute-force solution—a NuBus board for the Mac II with 4-MB of RAM, that keeps applications and huge files all resident in high-speed memory. Alterna-

(continued)

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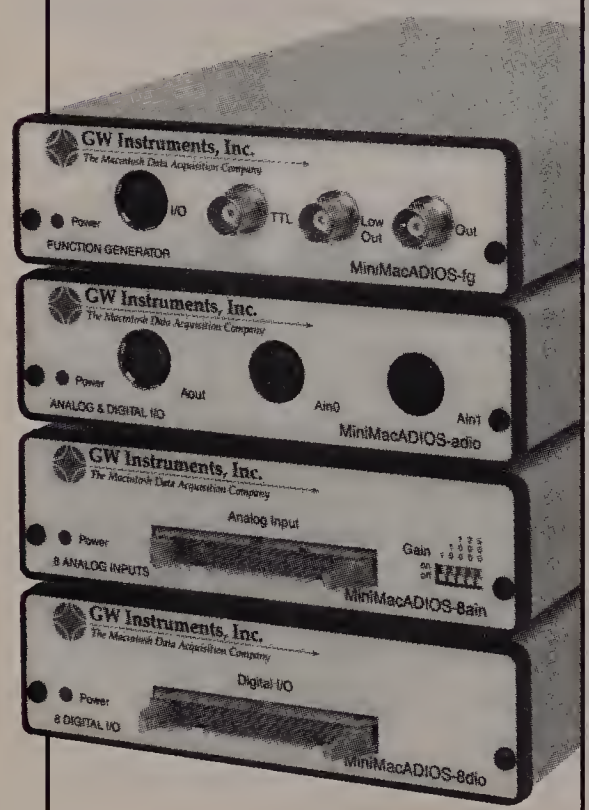

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tively, you could employ another person and buy a couple of Mac IIs with the money.

Monitors and Video Controllers

There are simply too many to list here—which is why these days we have to run two or three major monitor-evaluation articles a year. Our editorial offices look like the wharfs in some busy shipping port when we start receiving these things for review. One note of interest: several major suppliers to the IBM PC market have announced their interest in the Mac market over the past year, including Sigma, Princeton Graphics, Taxan, Mitsubishi, NEC, and others. But in this market they supply video controllers as well—Sigma began last year, and now Taxan has entered the market. After some initial specifications from Apple regarding 32-bit QuickDraw, many of the older Mac video suppliers have felt compelled to show 24-bit or 32-bit video boards: SuperMac, RasterOps, Radius, Micron Technology, and PCPC were all demostrating such boards. RasterOps also showed its QPDM video board (with an on-board AMD drawing processor), which speeds QuickDraw considerably, depending upon the application. This is the first attempt to use hardware to accelerate QuickDraw.

Storage

Three aspects of storage technology stood out at the show: removable hard drives; high-capacity hard disks; and numerous optical offerings. Mass Micro and Jasmine started the trend in removable 45MB hard drive media, followed by Microtech International, CMS Enhancements, and Crate Technologies. These things are great—a godsend if you have a lot to back up and can't really afford to stack up 300MB drives. The large capacities, 300MB and 600MB, always astonish me. I grew up in an era when 300MB meant a box that looked like a small freezer and was locked up on a raised floor. A 600MB internal for your Mac II? What do you do when it crashes, commit suicide? What do you back it up with—another 600MB drive? Anyway there were 300s and 600s from Imprimis, MicroNet, Relax, Microtech, and Jasmine.

The optical drives at the show were legion, and both the write-once, read-many (WORM) and erasable optical (EO) types were represented. Incredibly, only last winter the erasable optical drive for the Next machine was considered a risk, a breakthrough technology. Now it's got a SCSI interface and is available at a dealer near you. Storage Technology (WORM), Relax (EO), PCPC (EO), CMS, Jasmine, Dolphin Systems, Laserdrive, Macsetra, and Sumo all had drives, ranging in price from $3400 to $4900. So now we have 600MB to 800MB of storage available. Access time will be a problem, compared with magnetic technologies, but in many applications speed considerations will be outweighed by the ability to store and erase on an optical drive.

Color Output

Another oft-repeated complaint from those skeptical of color graphics on the Mac is the old saw "but there's no way to get hard copy." There are plenty of ways—the problem is cost and processing time. Agfa-Matrix showed what it says will be the first PostScript film recorder. Howtek had a $9000 thermal PostScript printer; Schlumberger, a $20,000 color thermal PostScript printer that will compete with the QMS ColorScript; and Tektronix unveiled a PostScript-clone, networked version of its thermal printer. Tektronix also showed a 216 dpi ink-jet printer for QuickDraw only. Hewlett-Packard had a driver kit ($125) for its PaintJet. And QMS showed its $12,995 PS2200 B-size laser printer (noncolor), only the second B-size–output plain-paper laser printer on the market. Crosfield Lightspeed announced the completion of a driver for its color prepress software for Hell and Scitex laser film plotters, and for Dicomed film recorders. Kodak showed and is shipping a thermal printer, the SV6500, that produces 3-by-4-inch prints of E-6 photographic-processing quality. Finally, Presentation Technologies had a new film back for its cameras, which enables you to make 3-by-4-inch transparencies or overhead presentations. And color output is only going to get better.

(continues)

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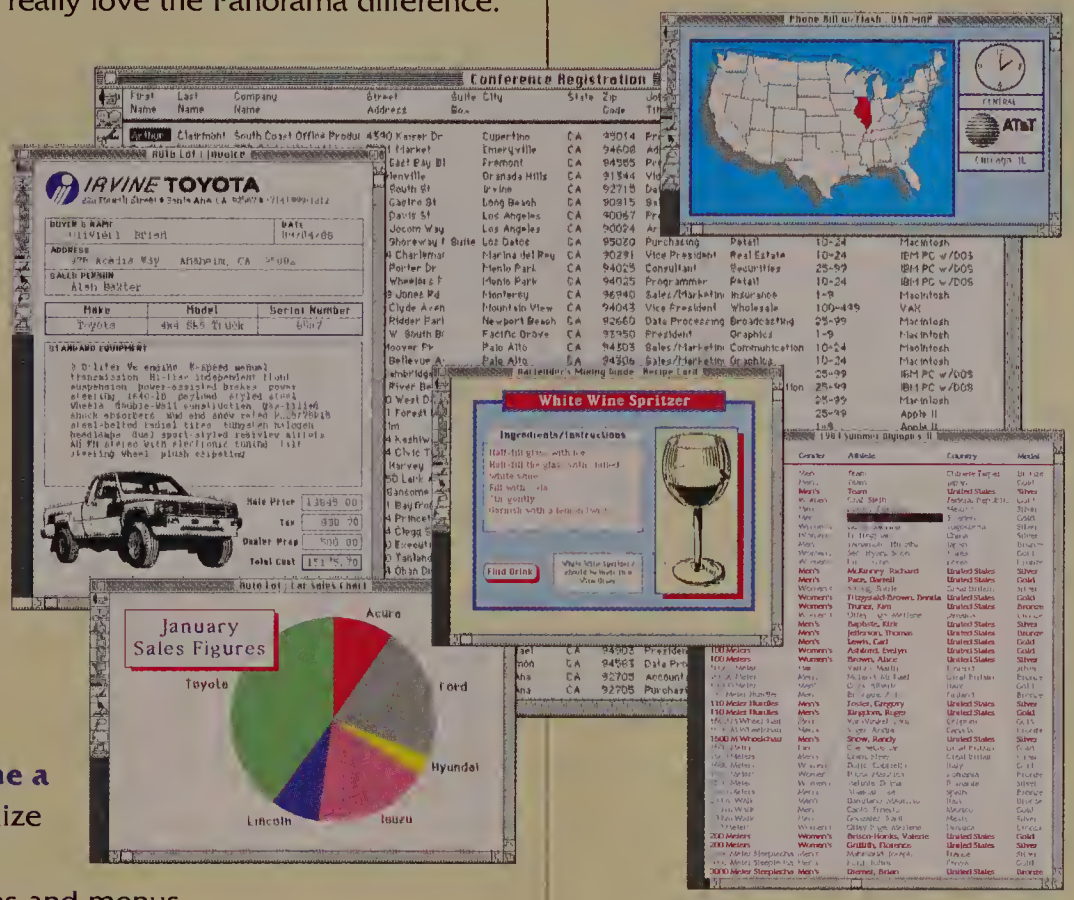

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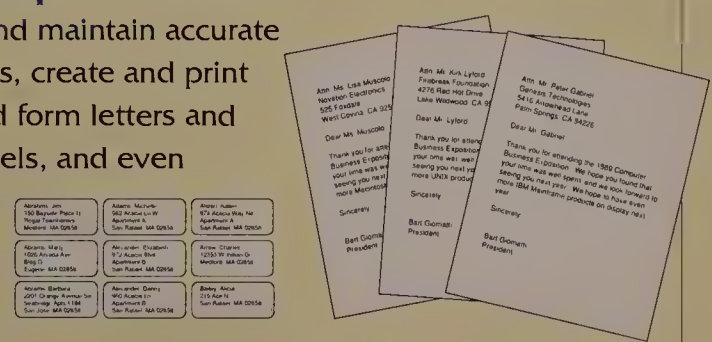

5. Outlines are an indispensable organizational tool you won't find in any other database. Panorama organizes your data into an outline structure on command, then automatically calculates summaries for each outline level. You can expand the outline to show the detail, or collapse it to see the big picture.

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7. Panorama's exclusive Flash Art gallery revolutionizes the way databases handle pictures. Until now, using pictures in a database meant tediously pasting in one picture at a time. Panorama's Flash Art avoids this time-consuming process by letting you key in pictures by name.

8. Panorama lets you work with both form and spreadsheet views of your data at the same time. Panorama's row/column spreadsheet view is simple and intuitive to use.

9. Panorama can import your existing FileMaker® data in seconds (over 10,000 records per minute). As an extra bonus, your files will actually shrink by 40 to 90 percent when converted into Panorama. Panorama can also convert data from 4th Dimension,™ Double Helix,® Excel,® Works,® and many more—all in seconds.

10. If the first nine reasons sound good, wait till you see how incredibly fast Panorama is. Like its predecessor OverVUE, Panorama establishes a quantum leap in database performance. Panorama out-searches, out-sorts, out-calculates, outperforms, and generally outclasses the competition.

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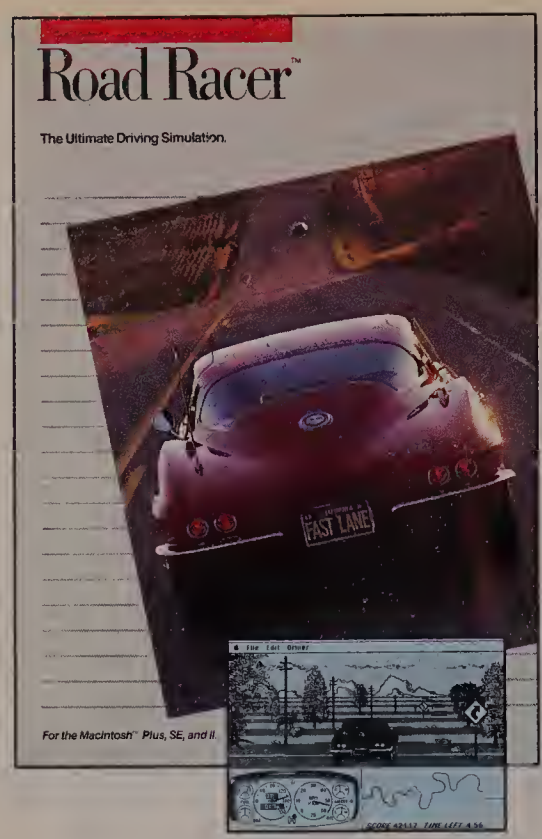

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Graphics

A perpetual favorite, Mac graphics never ceases to surprise me. Levco has ported all of Pixar's Photorealistic Renderman software to its transputer board on the Mac II. Minicomputer-based animation software, the result of a decade of development, is now available on the Mac. Cricket announced a new color-paint package. Electronic Arts, in a tour de force, showed 8-, 16-, and 24-/32-bit versions of its Studio paint program. SuperMac showed a 24-bit version of PixelPaint. LaserPaint has a new version (1.9) with a better interface. SuperPaint version 2.0 has finally shipped, and in the SuperMac booth was a truly innovative CAD system for fashion design. VIDI (Visual Information Developer Inc.), formerly VII, has redesigned two earlier imaging and animation programs into a package called Presenter. A firm from France, 2AI, is selling its Bimage image-processing software in the United States. Strade has finished its presentation software for the Mac, PresentationPro. Letraset was quietly showing a color version of its ImageStudio software off the show floor (ColorStudio). Enabling Technologies showed a new 24-bit version of Pro3D, as well as a rendering package called PhotoFinish expected to be ready in the second quarter of 1989. It really looks exciting. MacroMind released MacroMind Director (its working title was VideoWorks Professional), selling for $695.

Desktop Publishing

At the Expo there was actually relatively little happening in the mainstream DTP world. Interleaf announced version 3.5, and Brøderbund's TypeStyler should be shipping by the time you read this. But the main additions to this market came from font suppliers: Bitstream, Compugraphic, Varityper, Olduvai, Image Club, Casady & Greene, GCC, Adobe, and Postcraft International (which showed two new packages of font effects). Icom Simulations' MacKern allows kerning to be added to outline fonts. Altsys, developer of Fontographer, has a new $99 product, KeyMaster, which allows development of EPS fonts. Kingsley/ATF introduced Type Foundry, an outline-font design system for $495, and ATF Typographer, a $595 page-layout program.

In the realm of advertisement layout, Multi-Ad Services showed Multi-Ad Creator for design and layout of newspaper ads. It costs $995.

Clip Art

Desktop publishers and others seem to have an insatiable appetite for clip art—this category of products has expanded dramatically over the past two years. New libraries of clip art—primarily in EPS format—were announced by Multi-Ad, Adobe (libraries of PostScript patterns and textures), T/Maker, Image Club, Dream Maker, Casady & Greene, and 3G Graphics.

Word Processors

The big news is that Claris has announced MacWrite II, a completely rewritten version of the Mac's best-selling word processor. Paragon Concepts is shipping Nisus, a technical writing–oriented word processor. Deneba has shipped BigThesaurus, the first licensing of *Webster's New World Thesaurus* in an electronic form. This one contains antonyms, synonyms, derivations of words, and their grammatical identity.

Math Processors

One small field of products—math and equation processors—is undergoing tremendous growth; Wolfram Research's Mathematica is only one of the latest. New versions of MathType, MacEqn, and Expressionist are all in the works. Bonadio & Associates is demonstrating Theorist, an algebra processor with 3-D color graphics. A new package for the Mac, Numerica was announced at the show. Paracomp began shipping its math processor, Milo. The field has moved rapidly from merely printing mathematical formulae toward interactive mathematics and printing on the Mac.

OCR

Optical character recognition has moved faster on the Mac than on any other computer, in part because of its use of typefaces. Mac software recognizes font outlines, so we should expect

(continues)

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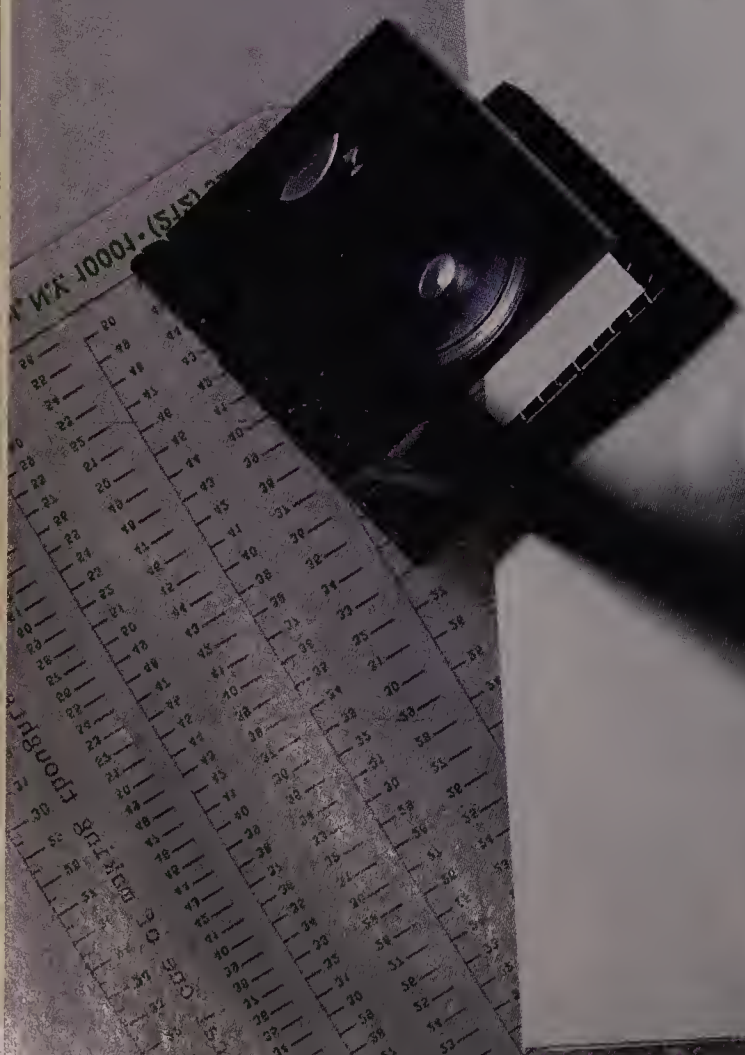

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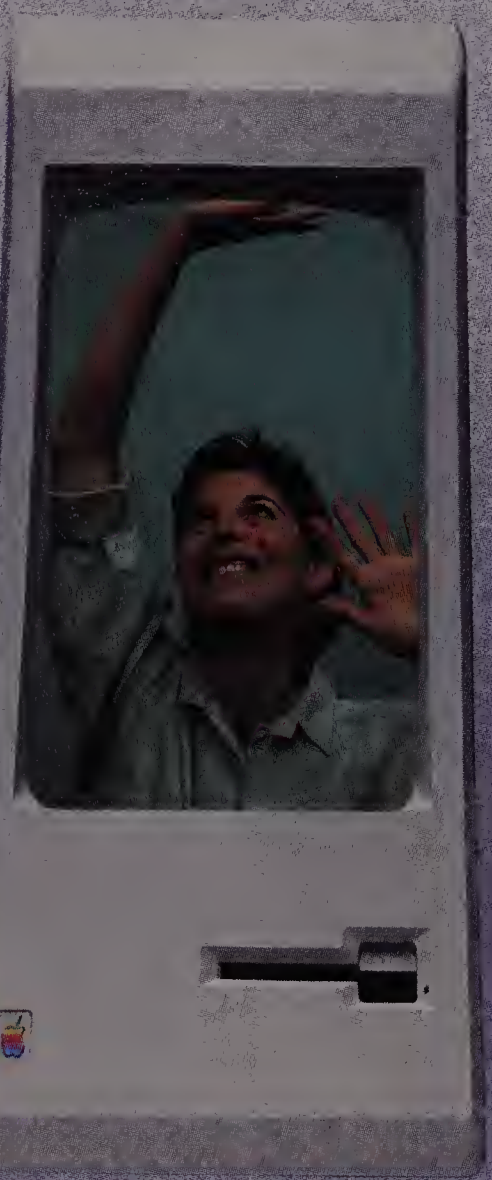

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OCR technology to move ahead. Xerox's recent acquisition of Datacopy has led to cross-fertilization of Kurzweil OCR and Datacopy technology for the Mac. Xerox/Kurzweil/Datacopy announced AccuText for the Mac. Olduvai has a new version of Read-It, its trainable OCR software that also runs on the new handheld scanners from Logitech, Thunderware, and Computer Friends. Tutorland introduced new OCR software for the Apple scanner, called AutoRead.

Computer-Aided Design

While Versacad is occupied with releasing a new version, and AutoCAD has substantially rewritten its product for the Mac, Infinite Graphics is now shipping its powerful 3-D solid modeler In-CAD for the Mac, and Schlumberger is shipping MacBravo, a product based on its minicomputer line of CAD products. MSC Pal has announced its intent to port its full library of engineering analysis software from the IBM PC family, and now has a complementary geometry processor—LapCAD—that can accept data files from existing Mac CAD packages and generate finite element meshes for analysis with Pal. An Australian firm, 12 Metre Graphics, showed a hull analysis package for the Mac. Finally, Vector from MicroConcept is another 3-D Mac software entry. Development in this area has been slow for several reasons: because Mac graphics have just begun to mature in the realm beyond 8 bits of color, because developers did not understand the difficulty in writing software for the Macintosh, and because of QuickDraw's evolution.

Games

Games are also making progress. Activision Entertainment (now a division of Mediagenic) is shipping a CD ROM–based version of Manhole that is a great deal of fun to play with, but it's more a demonstration of what can be done with Mac graphics and games. Mindscape released a color version of Colony, its 3-D shoot 'em up, and Gauntlet, a Mac II color version of the arcade game. Captain Blood is on the way. Microillusions showed Faery Tale, a graphics-and-text adventure game. PCAI is now shipping Road Racer for the Mac II, an adaptation of PoleRunner, the race-car track game.

Artificial Intelligence

AI appears to be having a period of strong growth. Texas Instruments (which wagered on the Mac II by selecting it as a base platform for its LISP processor–based microExplorer) showed several new products in its booth, including KEE, a new $30,000 knowledge-based development system from Intellicorp. Symbolics, which similarly decided to put a LISP processor on a NuBus card, was showing its MacIvory product in the National Semiconductor booth. It made me wonder if the Mac could, through some strange twist of fate, end up becoming the platform that AI developers have long sought. Both Texas Instruments and Symbolics have flirted with Sun Microsystems for years now. Neuron Data has forged a strategic alliance with Oracle, the $400 million (per annum) developer of databases, and ExperTelligence has a new product called Action (a development support product), which sells for $1995. Cognition Technology is well into development on the professional version of MacSmarts. All in all, a very good show for this area of technology. Coral, developer of LISP for the Mac, was recently acquired by Apple, so there appears to be some growing interest in what the Mac can do in this field.

Weird and Wonderful

A new category, or at least a new heading for products that are neat but that don't deserve a separate heading. One of the best was a wireless version of AppleTalk from DataSpace, called Arlan/Telenode. MultiClip from Olduvai allows you to open multiple clipboards simultaneously. Avery and Williams & Macias offered laser labels. Julian Systems is marketing a high-end video editing system from Seahorn Technologies. The color FX board from Mass Micro creates special video effects for

(continues)

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the Mac akin to the ADO from Ampex. Berkeley Systems Design showed Outspoken (okay, I don't like MacinTalk). I saw a host of boards for industrial purposes from National Instruments and Strawberry Tree Computers. Kensington Microware has a glare filter for 19-inch monitors (please, someone build one that affords us some radiation protection). Virus protection was available in a new version of Virex from JC Software and in BulletProof from Spectra. The WristMac from Ex Machina is an LCD watch that accepts 80 watch-screens of data from the Mac and also downloads to the Mac. Finally, Personal Writer's latest version of its software makes its tablet useful for more than just handwriting recognition.

Communications

No summary of Macworld Expo would be complete without a mention of communications products, but as with hard drives and monitors I can only point out a few. In the all-important category of Mac-PC connectivity, DataViz has a mountain of updates for AFP, which will also show up in products from Dayna and TOPS (both of whom license the DataViz file translators). There is also a new version of MacLink Plus (4.0). Insignia's new version of SoftPC, the software that allows DOS programs to run on the Mac, incorporates functions such as cut and paste, use of the SWIM chip, and background operation. PerfecTek, developer of the first 80286 board for the SE, now has a 286 board for the Mac II, and in cooperation with Datasys, allows for speedy operation of DOS programs in a window on the Mac. It's real strange running Lotus 1-2-3 on a Mac II, but at least it's fast with these products.

Many companies released communications boards for the new SE. Avatar has a Mac Mainframe SE/30 (and a new version of the software) as does DCA with MacIrma SE/30 and Kinetics with EtherPort SE/30. Similarly, Tri-Data Systems has advanced its Netway family of products for IBM mainframe connections. Dove has an Ethernet card for the SE/30. There are additions to the DEC

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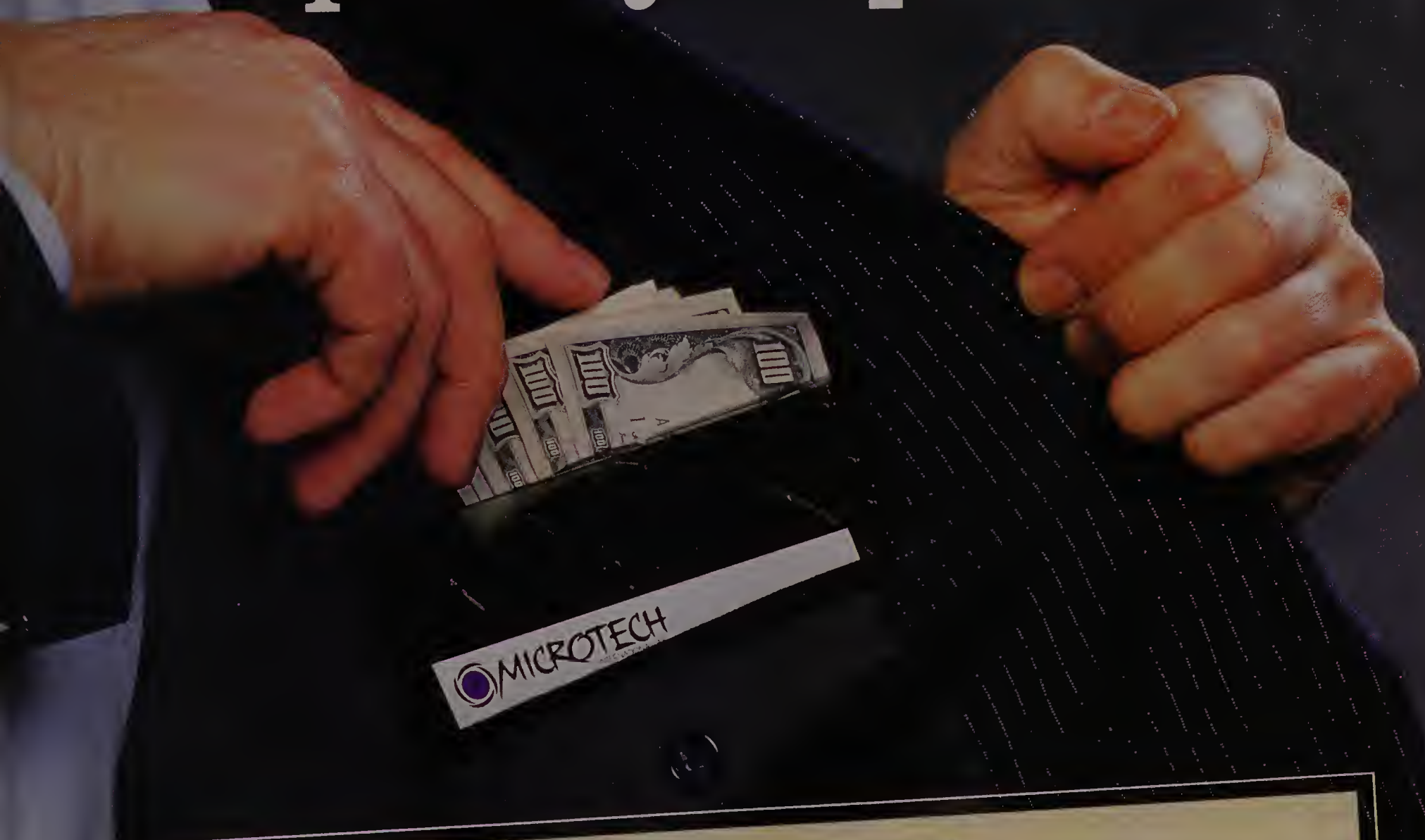

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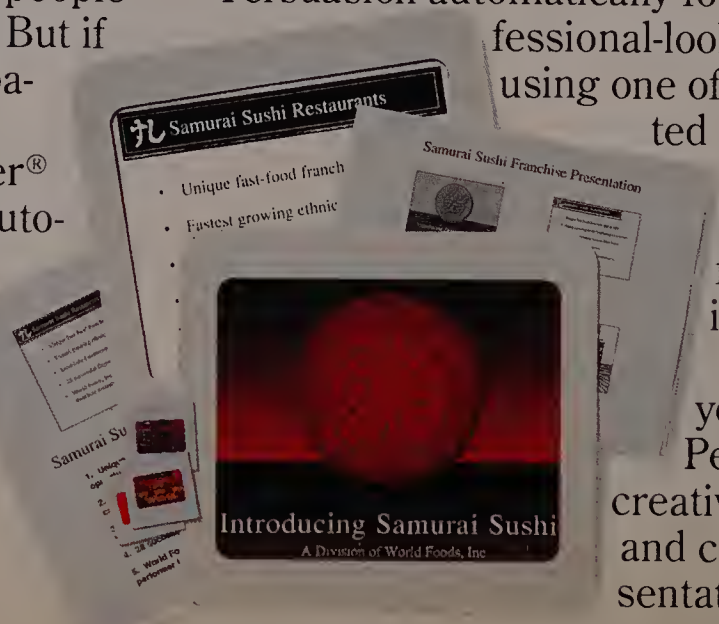

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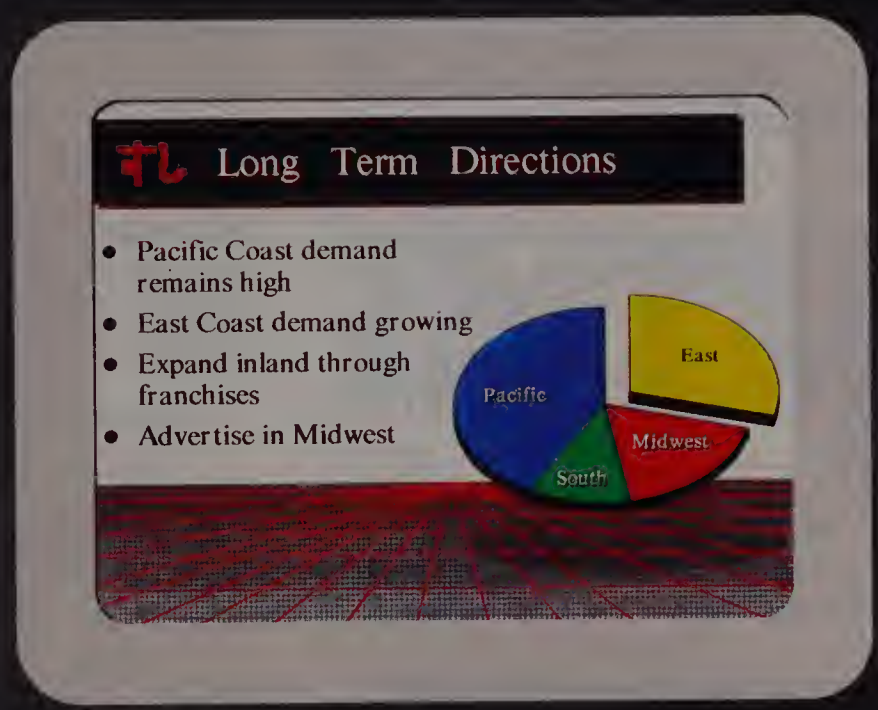

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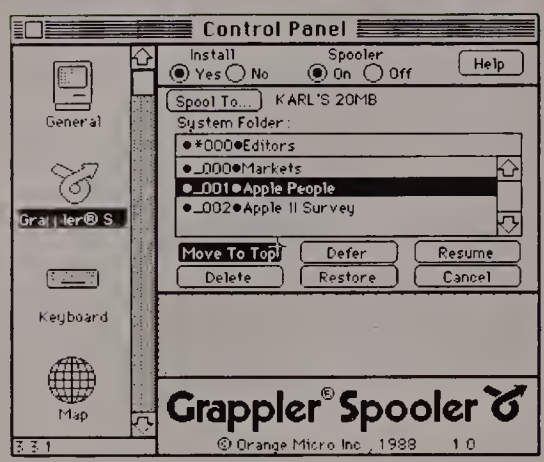

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connectivity environment from Synergy Software (maker of VersaTerm) and from White Pine Software. Software Ventures was demonstrating a new version of MicroPhone II that supports icons. Hayes has a new version of Smartcom II for Hayes-compatible modems. Infosphere is now shipping its network management software, Liaison, which bears some similarity to the SilverServer and Silver-Lining products from La Cie (new versions of these are also shipping).

Although a number of new products are coming from Farallon, none were on the show floor. Farallon has found such success (having shipped over 700,000 AppleTalk nodes, it now rivals Apple) that it has engendered competitors such as Nuvotech, which also sells an AppleTalk replacement cable and network-analysis software. Nexsys has entered the network-diagnostic-software market with Intellinet.

New Versions

Other new updates you should get if you already own the products: PixelPaint 2.0; Works 2.0; Graphisoft/Archicad 3.31; Managing Your Money 2.0; Clients and Profits 4.0; Picture Base 2.0; MacSafe 1.03; WordPerfect 1.02; SmartScrap 2.0; Pegasys 3.2; PowerPoint 2.01; Fox Base+Mac, the multiuser version; FreeHand 2.0; DeskPaint 2.1; Inside Out 1.2; VersaCAD 2.1; McMax 2.0; Courseware 1.5.

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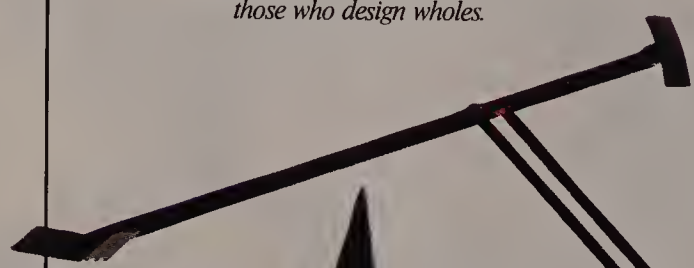

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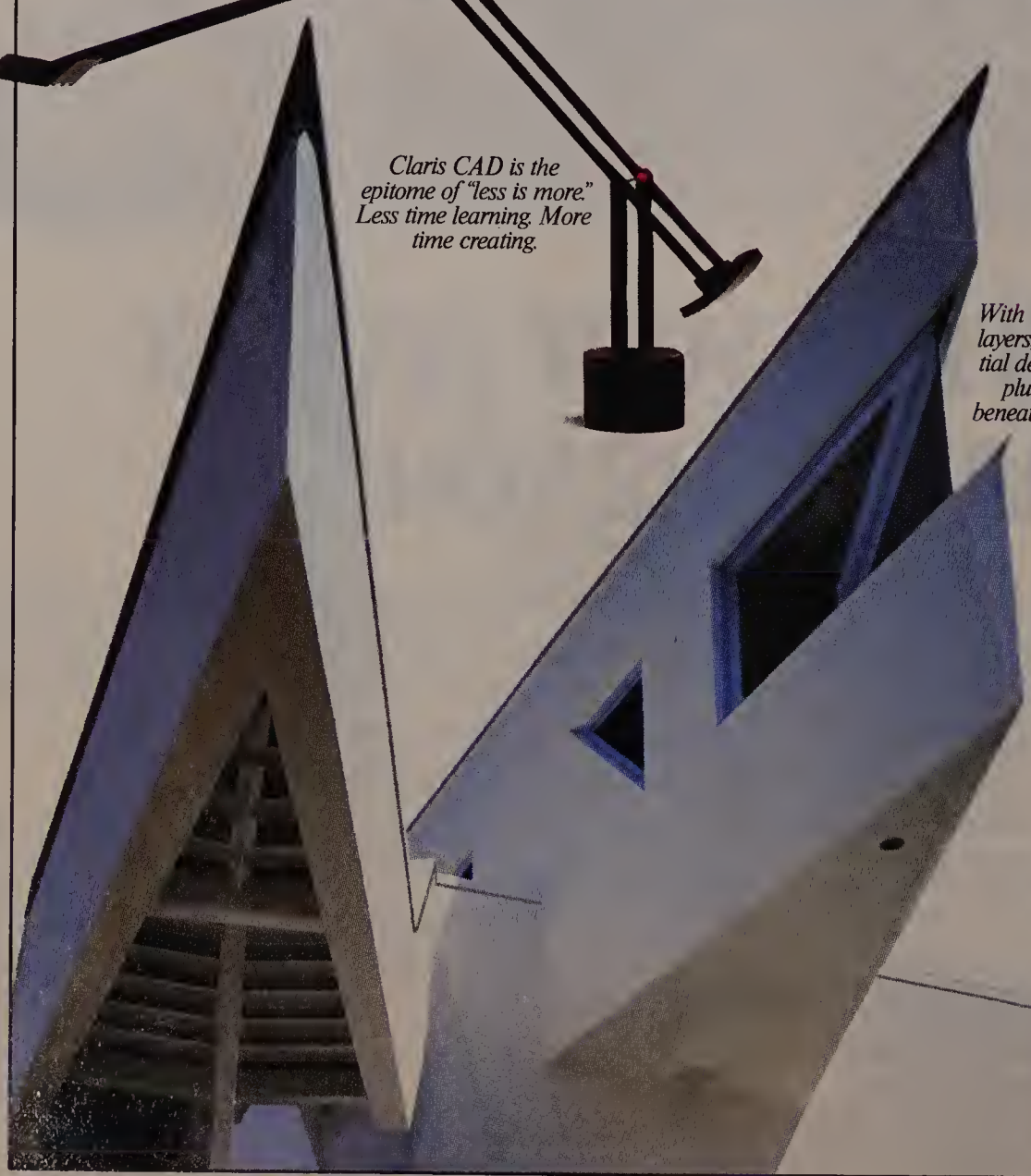

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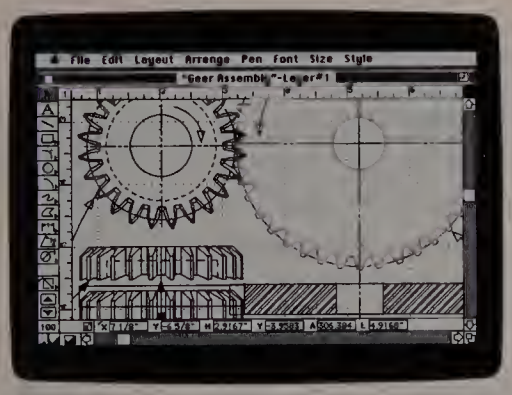

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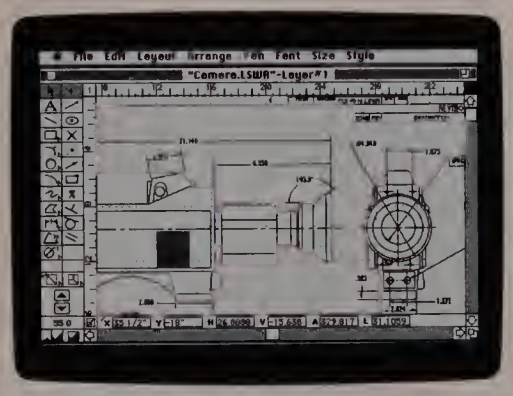
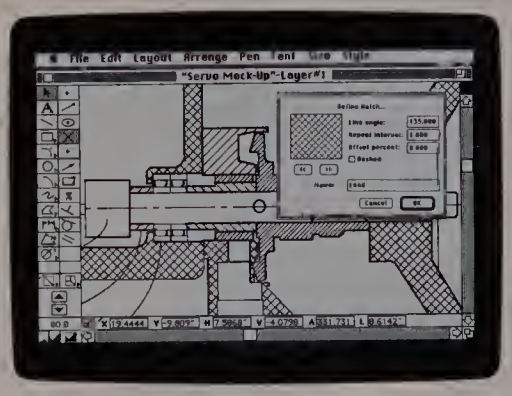
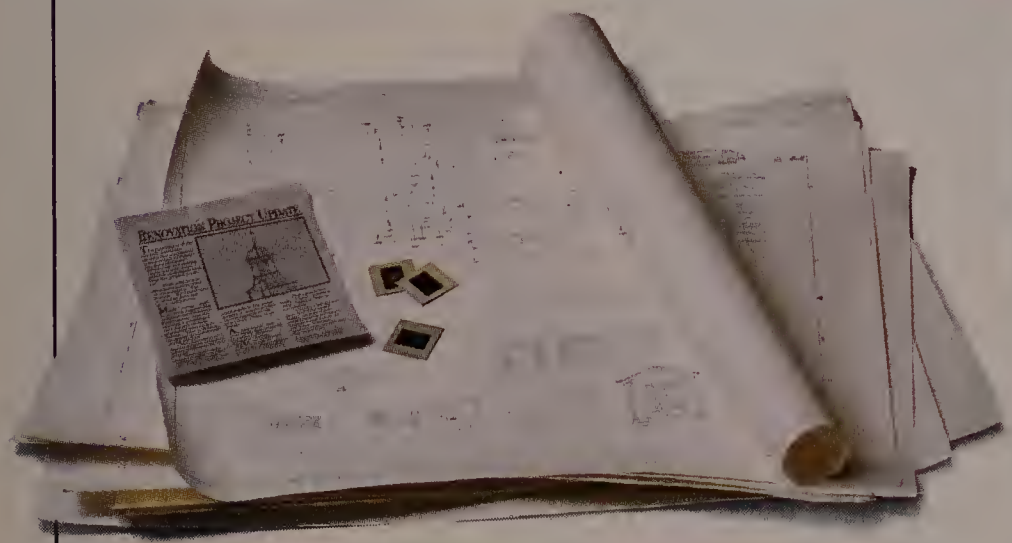


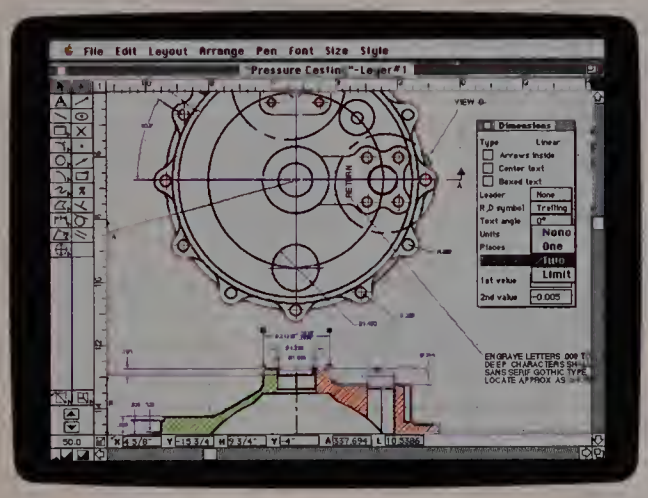
Fillets, tangents, keyboard entry, double lines and automatic dimensioning turn your ideas into realities with exacting precision.



Customizable pens, dashed lines, hatch patterns and dimension appearance give you a new level of versatility.



Claris CAD makes it easier to sell your inspirations. Plot your plans, concept sketches, schematics and working drawings exactly as you see them, turn them into slides or overheads, or cut and paste them into proposals and reports.



Keeping the vision in your revisions is easy. Because you don't have to redraw from scratch.

Claris CAD integrates with other CAD software via optional IGES and DXF conversion programs. So you can move them to larger CAD/CAM systems for 3-D modeling and prototyping.

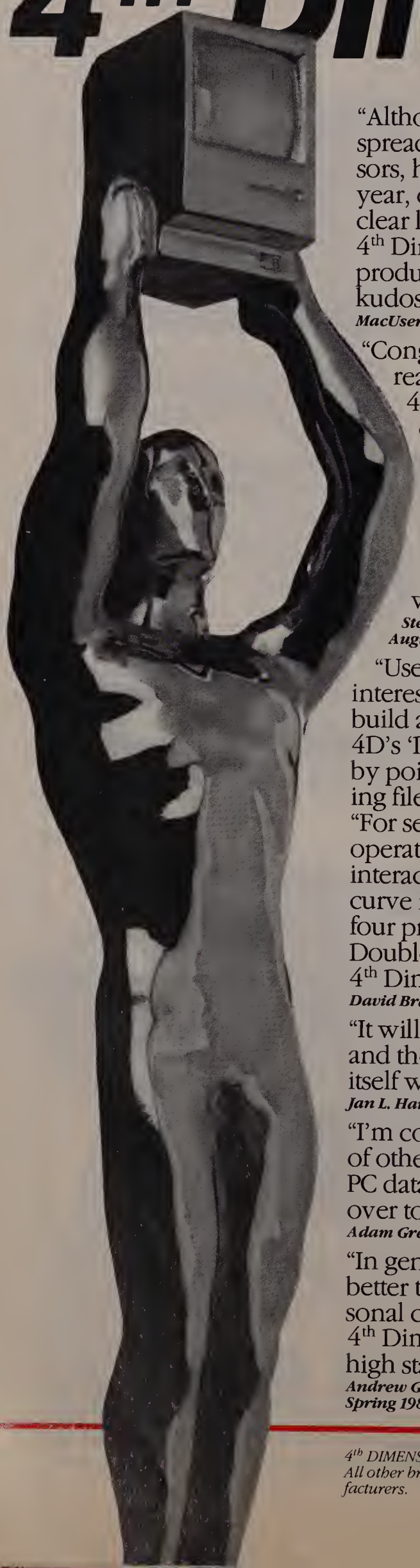
Here's the next step: order the Claris CAD Starter Kit, just $29.95 (refundable when you buy the complete program). To order, call 800-628-2100. And see how intelligent design begets intelligent design.

Introducing Claris CAD. CLARIS™

*introductory price is available to registered MacDraw II users. Call **800-628-2100**. Claris is a trademark and MacDraw is a registered trademark of Claris Corporation. Macintosh is a registered trademark of Apple Computer, Inc. DXF is a trademark of AutoDesk, Inc. For the name of the Claris dealer nearest you, call **800-3CLARIS, ext. 200**. In Canada, call **800-668-8948**.*

"... the clear leader 4th DIMENSION..."

MacUser



"Although this category, unlike spreadsheets and word processors, had a lot of new players this year, one seemed to us to be the clear leader.
4th Dimension, the powerful first product from ACIUS, takes the kudos."
MacUser, February 1988

"Congratulations! InfoWorld's readers have chosen 4th Dimension as the Product of the Year in the Macintosh Database Systems category."
Jonathan Sacks, InfoWorld, April 1988

"I can't imagine a data-management problem that you won't be able to solve with 4th Dimension."
Steve Mann, Macintosh Today August 11, 1987

"Users with no experience or interest in programming can build a barebones database in 4D's 'Design Environment' just by pointing, clicking, and naming files and fields."
"For searches and sorts - database operations that are performed interactively - 4D's performance curve is probably the best of the four programs (Omnis 3 Plus, Double Helix II, dBASE Mac, and 4th Dimension)."
David Brandt, MacWEEK, January 19, 1988

"It will do everything you need, and then some, and will prove itself well worth the cost."
Jan L. Harrington, MacUser, November 1987

"I'm convinced that many users of other Mac databases and even PC databases will want to switch over to 4th Dimension."
Adam Green, Macworld, July 1987

"In general, Macintosh software is better than software for other personal computers...
4th Dimension redefines those high standards."
Andrew Gore, The Macintosh Buyer's Guide, Spring 1988

"4th Dimension from ACIUS, Inc. of Cupertino, California, outshines the other databases we tested both in number of features and in rich database development environment."
Don Crabb, InfoWorld, January 11, 1988

Want to try it out?

For $20, we'll send you a demo disk and comprehensive 50-page user's manual.
Call today and find out what 4th Dimension can do for you.

- **Relational database**
- **Multi-user**
- **Intuitive interface**
- **Graphics and pictures**
- **Automatic forms & reports**

Yes you can!

$20 Demo Offer
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Demo version bundled on all Jasmine Hard Disk Drives.

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Cupertino, CA 95014
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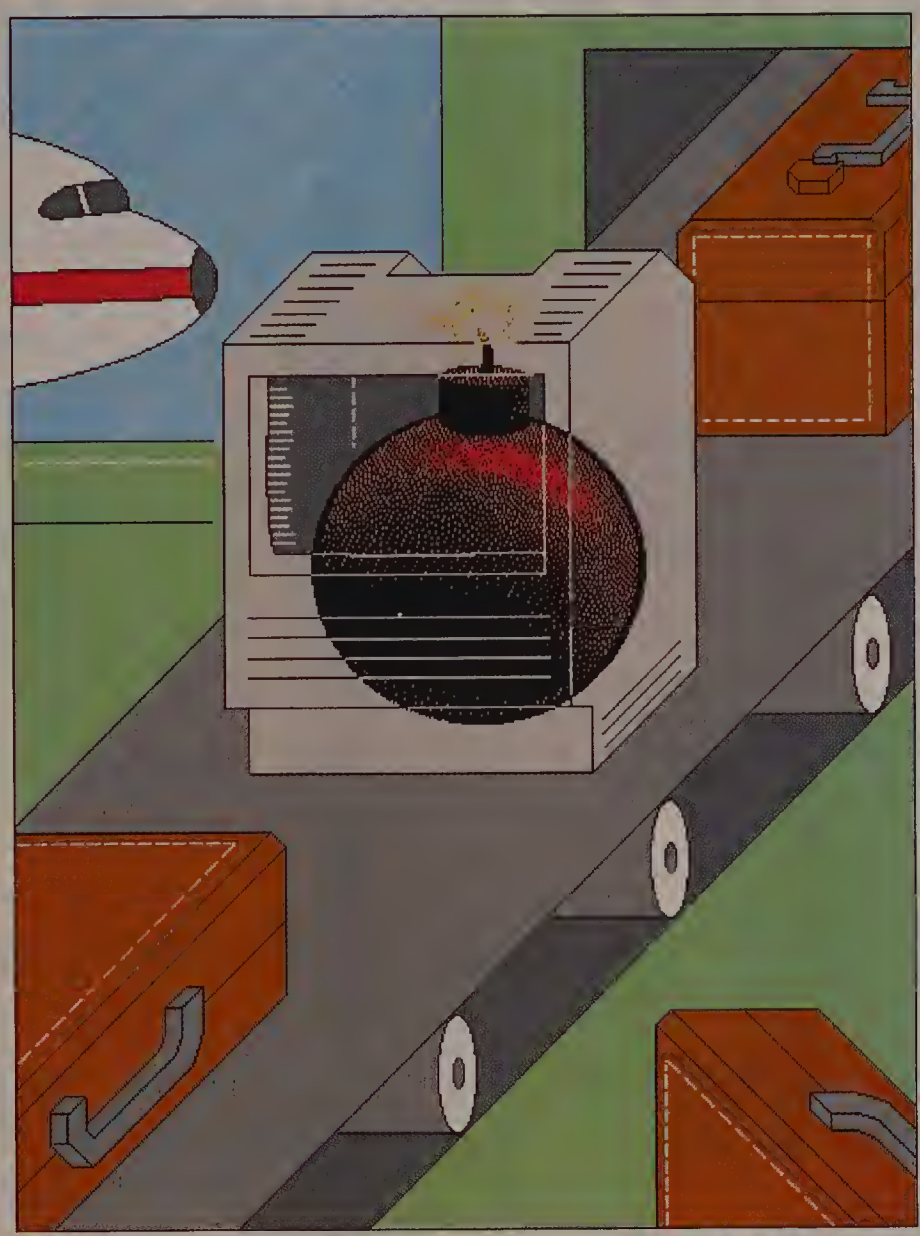
Letters

A forum for Macworld readers



SCOTT BALDWIN

Lights, Camera, Action
I am a college student who hopes to become a writer. I will begin my studies in the screenwriting program at San Francisco State University in the fall of 1989. Is any script-writing software available for the Mac Plus?

Mario Alejandro Henriquez
San Francisco, California

There are several, including CineWrite (at press time, 2.3 was the current version; a newer version should be out by the time you read this), $495, from Max3, 213/398-3771; and Scriptwriter, also $495, by American Intelliware, 213/533-4040 (recently we've had problems contacting this vendor). Thomas Brown, a New York independent film producer, uses Scriptor 1.4, $295, by Screenplay Systems, 818/843-7819. Hal Barwood, a writer/producer/director who has worked for Lucasfilm, finds script-writing programs too cumbersome and inflexible. Instead, he uses WriteNow and creates a screenplay format using MacroMaker (part of System 6.x), then saves the format to apply to his work.—Ed.

A Bomb Hits Shanghai
Last year I worked in China on a French film as first assistant director. It was the third film on which I used my Macintosh but the first time I traveled with it in such a remote country. Needless to say, my colleagues at the Shanghai Film studios were fascinated with my "magical box." While it took me three days to schedule 23 weeks of shooting, they needed a crew of ten assistant directors to deliver hand-written the same work. My last day in China, as I was leaving Shanghai for Hong Kong, I had to put my Mac through the X-ray machine before boarding my plane. The woman at the machine asked me to open the Mac. After explaining to her that I couldn't, I convinced her to let me switch it on so she could see that no bomb or gun was hidden inside. After plugging in my transformer and wiring everything in front of two customs officers and a translator, I prepared to show them the beauty of MacPaint. They were looking for a bomb and they got one as soon as I booted my HyperDrive!

Pierre Magny
Montreal, Quebec, Canada

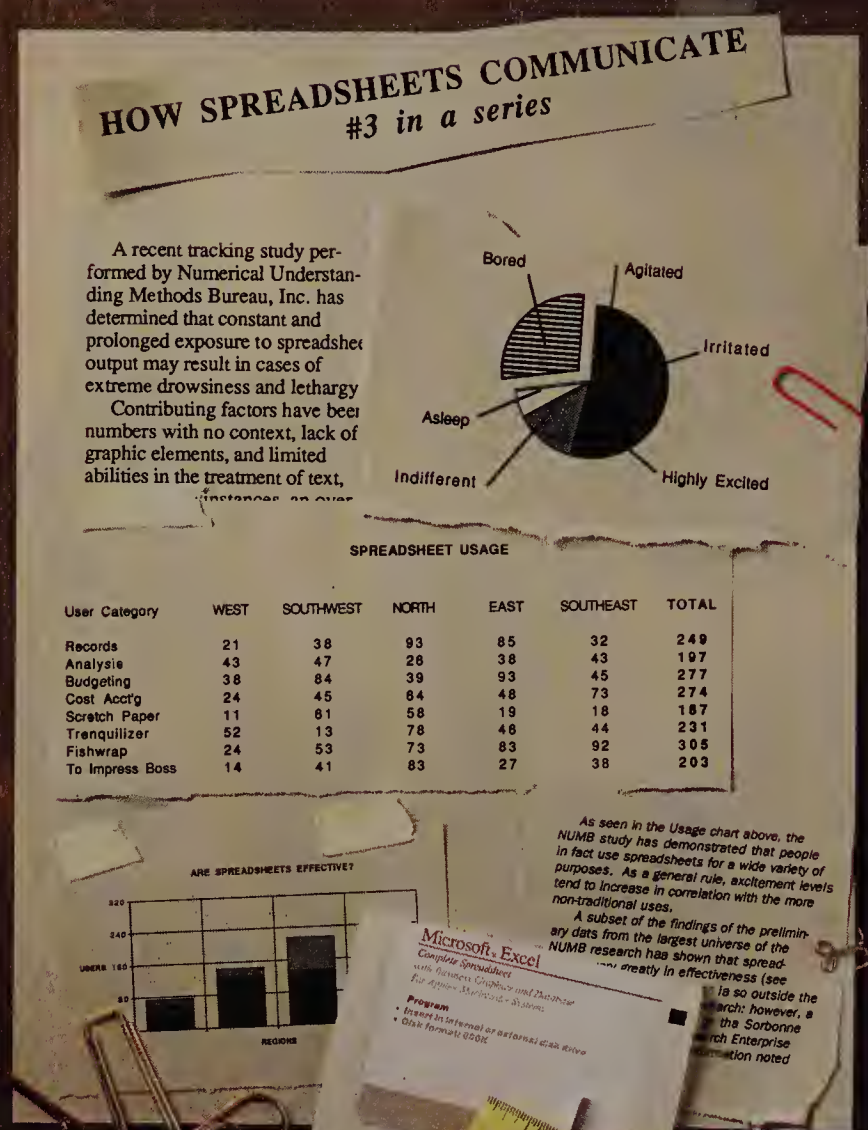
Corrections
The Connect Professional Information Network ("Great Communicators," December 1988) is run by Connect Inc., 10101 Bubb Rd., Cupertino, CA 95014, 800/262-2638; MacNet is its telecommunications software for the Mac.

The phone number for Carina Software, maker of Voyager (Macworld News, *February 1989) is 415/352-7328.*

A Lack of Communication
Your article "Great Communicators" [December 1988] states that VersaTerm-Pro offers Tektronix graphics terminal emulation not available in other programs. We would like to point out that our TextTerm+ Graphics not only offers Tektronix graphics terminal emulation but also provides the

(continues)

TRY FULL IMPACT AND SEE WHY EXCEL DOESN'T.



HOW SPREADSHEETS COMMUNICATE
#3 in a series

A recent tracking study performed by Numerical Understanding Methods Bureau, Inc. has determined that constant and prolonged exposure to spreadshee output may result in cases of extreme drowsiness and lethargy

Contributing factors have bee numbers with no context, lack of graphic elements, and limited abilities in the treatment of text,

Bored
Agitated
Irritated
Asleep
Indifferent
Highly Excited

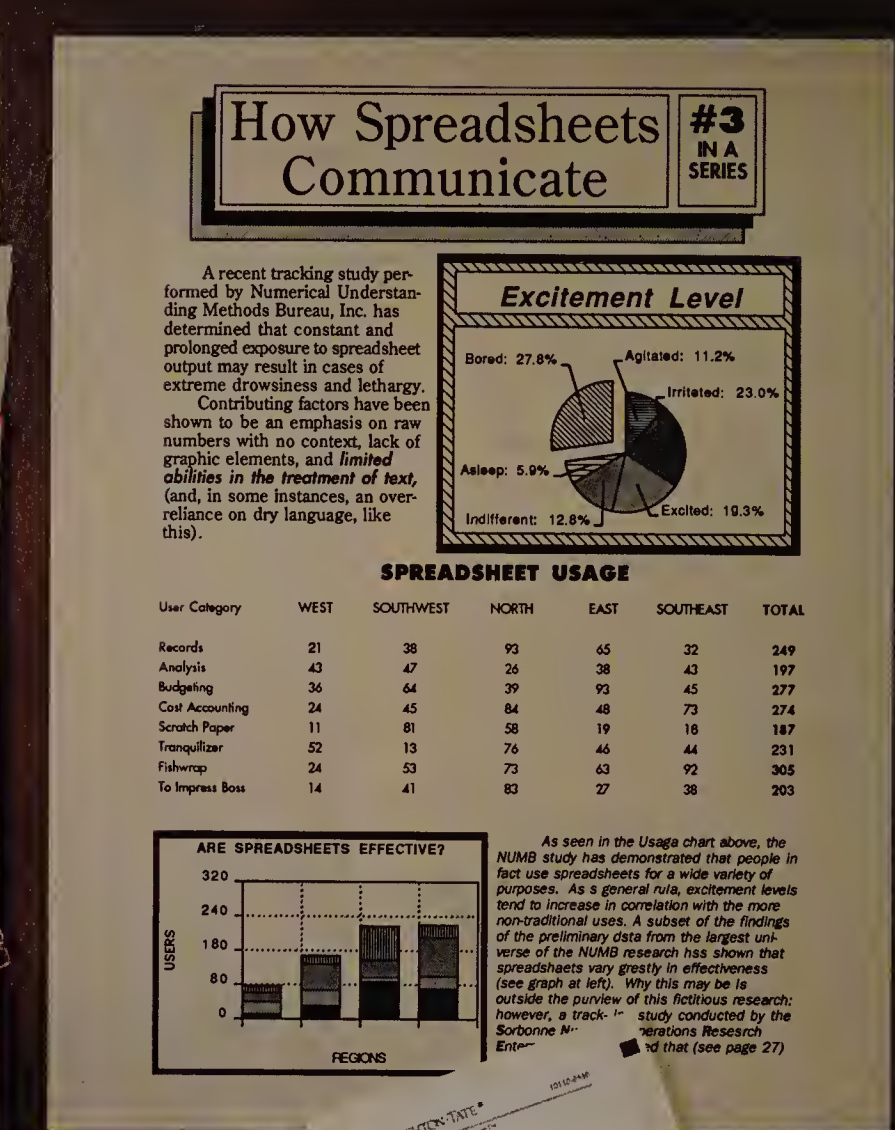
SPREADSHEET USAGE

User Category	WEST	SOUTHWEST	NORTH	EAST	SOUTHEAST	TOTAL
Records	21	38	93	85	32	249
Analysis	43	47	26	38	43	197
Budgeting	38	84	39	93	45	277
Cost Acct'g	24	45	84	48	73	274
Scratch Paper	11	81	58	19	18	187
Tranquilizer	52	13	78	46	44	231
Fishwrap	24	53	73	83	92	305
To Impress Boss	14	41	83	27	38	203

ARE SPREADSHEETS EFFECTIVE?
USERS
REGIONS

As seen in the Usage chart above, the NUMB study has demonstrated that people in fact use spreadsheets for a wide variety of purposes. As a general rule, excitement levels tend to increase in correlation with the more non-traditional uses.

A subset of the findings of the preliminary data from the largest universe of the NUMB research has shown that spread greatly in effectiveness (see



How Spreadsheets Communicate

#3 IN A SERIES

A recent tracking study performed by Numerical Understanding Methods Bureau, Inc. has determined that constant and prolonged exposure to spreadsheet output may result in cases of extreme drowsiness and lethargy.

Contributing factors have been shown to be an emphasis on raw numbers with no context, lack of graphic elements, and ***limited abilities in the treatment of text,*** (and, in some instances, an over-reliance on dry language, like this).

Excitement Level

Bored: 27.8%
Agitated: 11.2%
Irritated: 23.0%
Asleep: 5.9%
Indifferent: 12.8%
Excited: 19.3%

SPREADSHEET USAGE

User Category	WEST	SOUTHWEST	NORTH	EAST	SOUTHEAST	TOTAL
Records	21	38	93	65	32	249
Analysis	43	47	26	38	43	197
Budgeting	36	64	39	93	45	277
Cost Accounting	24	45	84	48	73	274
Scratch Paper	11	81	58	19	18	187
Tranquilizer	52	13	76	46	44	231
Fishwrap	24	53	73	63	92	305
To Impress Boss	14	41	83	27	38	203

ARE SPREADSHEETS EFFECTIVE?
320
240
180
80
0
USERS
REGIONS

As seen in the Usage chart above, the NUMB study has demonstrated that people in fact use spreadsheets for a wide variety of purposes. As s general rule, excitement levels tend to increase in correlation with the more non-traditional uses. A subset of the findings of the preliminary data from the largest universe of the NUMB research has shown that spreadsheets vary greatly in effectiveness (see graph at left). Why this may be is outside the purview of this fictitious research: however, a track- study conducted by the Sorbonne N erations Resesrch Ente d that (see page 27)

In Colorado, call 303-799-4900, ext. 3501. Trademarks/owner: Full Impact, dBASE, Ashton-Tate/Ashton-Tate Corporation; Microsoft, Microsoft Excel, Microsoft Works/Microsoft Corporation;

It's the difference between merely analyzing something, and actually seeing what it means.

Introducing Full Impact™, from Ashton-Tate.

Full Impact is a spreadsheet program designed expressly for the Macintosh that goes beyond the basic number-crunching capabilities of Microsoft Excel: it gives you the ability to easily turn your work into clean, crisp —and understandable—documents.

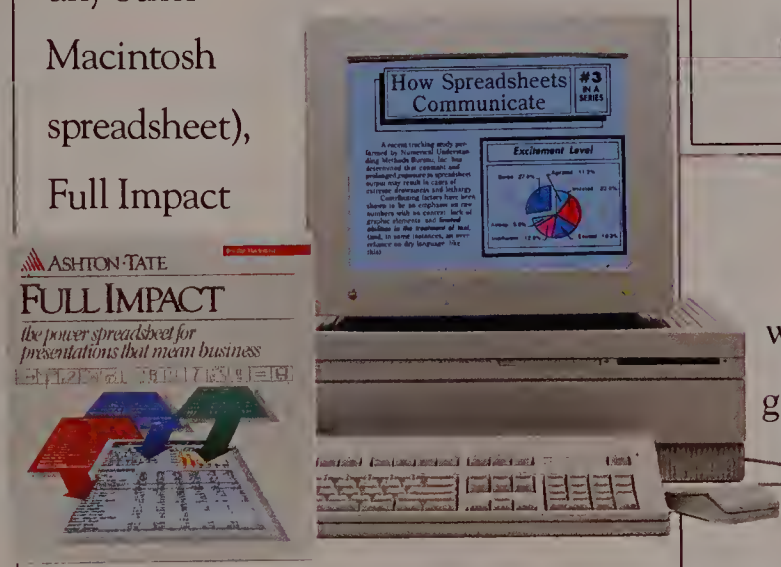
How? By letting you take full advantage of the way you're already used to working on the Macintosh.

Start by simply entering your data. Then, select all or part of it, and instantly create a chart using those values —simply by clicking on the appropriate chart icon from the icon bar.

Need to write some text explaining your analysis? And highlight certain passages? Full Impact's text editor gives you plenty of fonts, sizes, and styles to choose from.

What if that block of text would look better somewhere else? Fine. Just click on it, and drag it there. You can even bring in art from other programs, then merge it with your text and data, all on the same page.

But lest you get the impression that Full Impact is merely a presentation program disguised as a spreadsheet, consider this: with over half a million usable cells (far more than any other Macintosh spreadsheet), Full Impact



gives you more than enough room to handle even the largest projects. And more than enough speed to recalculate them quickly.

You can work with as many as eight spreadsheets simultaneously. And then link them all together. Or create powerful, time-saving macros, and even customizable icons to tie them to.

FULL IMPACT vs. EXCEL

	Full Impact 1.0	Excel 1.5
Power		
Usable cells with 1 Mb RAM	512,000	50,000
Linked spreadsheets	Yes	Yes
"C"-like macro language	Yes	No
Customizable icon bars	Yes	No
Presentational Capabilities		
Print charts and spreadsheets on one page	Yes	No
Mix fonts, sizes, styles cell by cell	Yes	No
Drawing tools	Yes	No
Easy-to-move, formattable text blocks	Yes	No

You can also exchange files with many other popular programs, including Excel and Microsoft Works, Lotus 1-2-3, all of Ashton-Tate's dBASE® products, and much more. So you won't lose your investment in your current data.

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We'd like to make it easy for you to get the full impact of Full Impact. Just call 800 437-4329, ext. 3501, and we'll send you a full-capability product sampler.

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Announcing LightningScan, the new hand-held scanner for Macintosh. From Thunderware.

Now one quick pass is all you need to scan any image up to four inches wide. With resolution settings up to 400 dots per inch, LightningScan™ makes almost any scanning job easier to handle. And because LightningScan is controlled by the software that helped make ThunderScan® famous, you have the powerful tools you need to enhance and edit your images. As for graphics compatibility, you name it: from PageMaker® and Illustrator™ to ImageStudio™ and Digital Darkroom.™

At its suggested retail price of $549, LightningScan makes the benefits of personal scanning very easy to grasp.

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LightningScan is compatible with the Macintosh Plus, Mac SE and Mac II. The following [illegible] are property of the companies indicated: LightningScan, ThunderScan, Thunderware [illegible] Thunderware, Inc.; Macintosh: Apple Computer, Inc.; PageMaker: Aldus Corp.; Illustrator [illegible] PostScript: Adobe Systems, Inc.; ImageStudio: Esselte Pendaflex Corp.; Digital Darkroom: Silicon Beach Software, Inc. ©1989, Thunderware, Inc. All rights reserved.

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fastest performance. Although we realize that the aim of your article was to highlight advanced features useful for communicating via electronic mail packages, we feel it is a disservice to your readers not to mention our easy-to-use, fast, and powerful Tektronix terminal emulator.

James E. George
Mesa Graphics
Los Alamos, New Mexico

We didn't mean to give the impression that VersaTerm-Pro is the only Mac program that offers Tektronix terminal emulation. However, since our intent was to cover general-purpose telecommunications software, specialized terminal emulators were not included in our analysis.—Ed.

Time After Time

Back in 1981 I found a program for the TI-59 called Sunrise/Sunset, which calculates sunrise, sunset, and civil twilight time with accuracy for any date, latitude, longitude, and altitude. Do you know of a similar program for the Mac Plus?

Abraham Krufka
East Hampton, New York

Carina Software (415/352-7328) makes a desktop planetarium program for the Mac called Voyager (see Macworld News, *March 1989), which has what you're looking for. By clicking on a star, a planet, or any other object in the galaxy, you can find its azimuth (position along the horizon), its altitude, its rise and set time, and its transit time (the point at which it's highest in the sky). A DA called Sun Clock, by MLT software (503/245-7093), indicates the current areas of day and night on a map of the world and enables you to calculate the time at any location.—Ed.*

From Another Perspective

I would like to add a few comments to the review of MacPerspective by David Peltz in his article on 3-D software ["3-D in Perspective," December 1988]. I was probably the first architect in Michigan to purchase MacPerspective to run on my 512K Fat Mac, shortly after I bought the equipment.

This program is an incredible improvement over the way most of us pro-

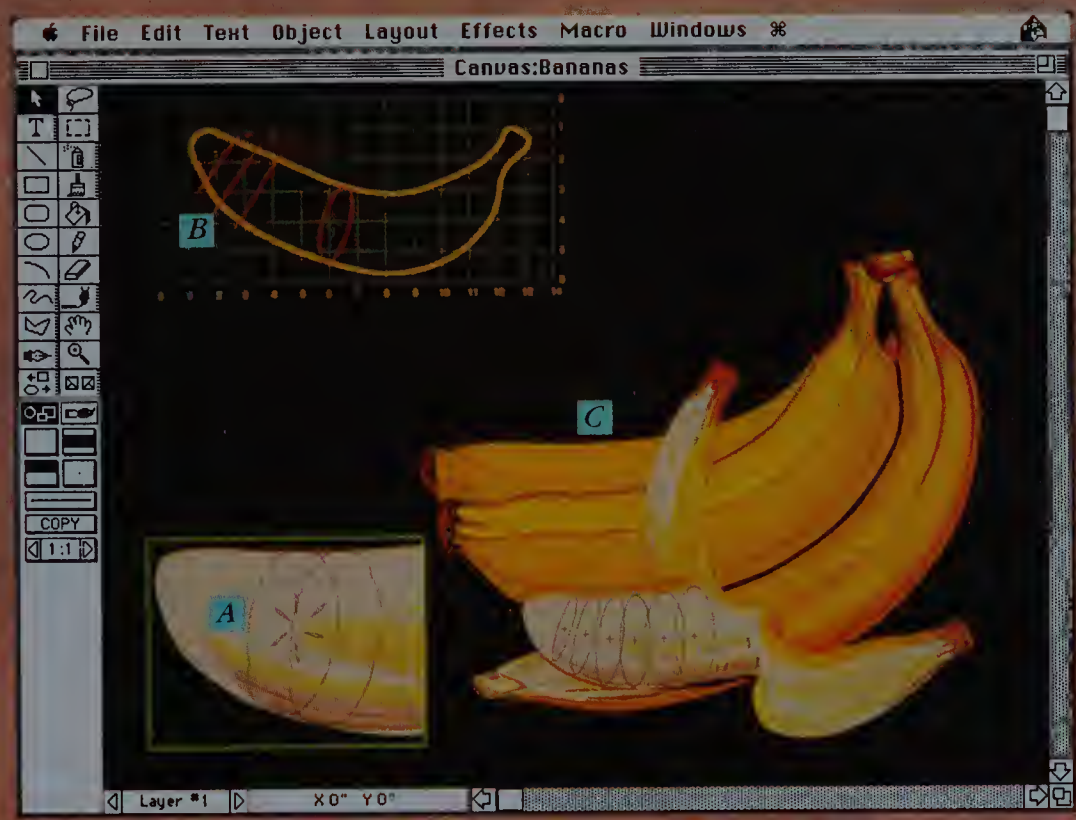
(continues)

A To an architect, fine hairlines like ours are pure poetry.

B Auto-tracing built this banana from a scanned-in produce ad. In split seconds.

C Multi-point bezier curves make drawing a bunch easier. Colors are added in layers.

D Auto-resizing helped this V.P. of Sales display the fruits of his labor, graphically.



E Smooth continuous color blending inspired this art director to new heights.

F What are mere words compared to WYSIWYG text with special effects?

G After he slipped away, we added rich Postscript® gray scales to the gorilla's leftovers.

FOUR INDIVIDUALS WERE GIVEN AN HOUR WITH THE NEW CANVAS 2.0.™

THREE WENT BANANAS. ONE ATE THEM.

How an architect, an MBA, and an art director developed instant talent in precision drawing. And a gorilla developed mild indigestion.

Meet Canvas 2.0. The new top banana. Able to help even ordinary people draw extraordinary things.

Easy enough for almost any primate to master.

Use our Bezier curves and smooth polygons to build any shape. Add or delete control points and join, split, open or close them at will.

Use Auto-Tracing to save countless hours by converting existing bit-mapped images – pictures like clip art or scanned graphics – into easily manipulated Canvas 2.0 objects.

Work across unlimited layers. View, print or save them in any combination. Draw in millions of colors, or with Postscript® gray scales and patterns.

Experience heart-stopping accuracy (64,000 DPI) and fineness of line (1/1000″). Zoom around from 3% to 3200% of original size. Draw continuously up to 9 feet square. Import and export freely, using PICT, PICT2, TIFF, MacPaint™ or MacDraw™* formats. Output to any Mac compatible printer, typesetter, or film printer you want.

Like we said: go bananas.

But do it soon. While we're still throwing in Canvas 2.0 DA for free. It's a special desk accessory version that puts some 80% of these features right under your Apple menu.

And if all this hasn't convinced you that Canvas 2.0 is the drawing program you've been waiting for, send us $9.95 to receive a fully featured Demo Copy. With which you can finish convincing yourself.

After all, power like this can be *very* apeeling.

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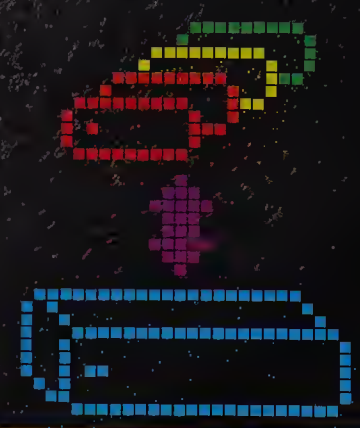
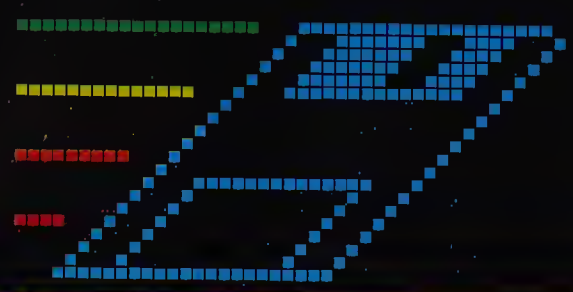
Deneba SOFTWARE

These unretouched drawings were created in Canvas 2.0 and output to a Mirrus film printer.





Increase the performance...

Run at top speed...

MultiDisk™

The sensational new disk partitioning utility!

[illegible] recognize the need to partition a disk. As hard disks have increased in size, the need has become critical. However, the Macintosh File System is so complex and [illegible] are so demanding, no adequate utility has been offered. We challenged the Macintosh disk experts who created DiskExpress to develop a solution. They succeeded with MultiDisk.

MultiDisk provides you with effortless partitioning. You can add or delete partitions at any time without having to erase your disk. MultiDisk has the **exclusive** ability to resize partitions that survey fragmented space (SUM and Hard Disk Partition) and DiskExpress to defragment the free space. Another **exclusive** is the ability to enlarge a partition without having to recreate it. You can start with a small partition and then grow it as needed. This prevents the waste of your valuable disk space caused by other partitioning software. A third **exclusive** is the ability to create partitions within partitions. Past partitions you've created with SUM or Hard Disk Partition can be converted into fixed sized MultiDisk partitions.

You can conveniently open partitions with a desk accessory. You can also have MultiDisk automatically open the partitions of each disk as they appear on the desktop. Network users of AppleShare™ and TOPS™ can remotely access partitions opened on a server.

You can protect partitions with a password. For more security, you can assign automatic DES-encryption to each partition.

MultiDisk partitions your HFS disks on SCSI and non-SCSI drives and has the **exclusive** feature to work correctly with your removable disks.

Suggested Retail $69.95

DiskExpress™

Apple Computer says . . .

"Finally, a hit arrives with multiple features, the fastest of a particular kind, [illegible] the best [illegible] Apple Computer [illegible]"

[illegible] the only optimizer [illegible] Macintosh disks. [illegible] the fastest way to optimize [illegible] the freeing of partitions. It [illegible] the same as any other space to release [illegible] only multiple [illegible] and [illegible] simultaneously [illegible] called [illegible].

Only DiskExpress is [illegible] compatible with [illegible] including [illegible] Apple Share™. [illegible] and [illegible] look up program [illegible] DiskExpress [illegible] space [illegible] regardless of [illegible].

Defragmenting can [illegible] your disk. [illegible] DiskExpress [illegible] is speed [illegible].

[illegible] DiskExpress [illegible] MAC [illegible] [illegible] program [illegible] [illegible] you're no DiskExpress!

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Circle 202 on reader service card

duce our drawings. MacPerspective enables you to input dimensional data in less time than either using the classic graphic method or using a printed perspective chart, and it lets you produce several views rapidly.

Since over half the architectural firms in this country have fewer than five people, equipment and software represent significant budget items. This inexpensive, easy-to-learn program fills a major need for the architect who isn't a graphic or computer specialist.

Albert J. Vegter
Ann Arbor, Michigan

Resolutions Resolved

We were pleased with your coverage of our product, the Grappler LQ [*Reviews,* December 1988], but there are several points that need to be addressed. You state that graphics can only be printed at 72 dpi, or screen resolution, when actually the Grappler LQ will print graphics at up to 300 dpi, depending on the resolution of the file format you're using.

Your information on font availability is correct but incomplete. Our upgraded font package, Alphabits, includes three complete sets of fonts (small and large sizes) and five headline fonts (18-point and 24-point screen fonts supported). These are licensed from Bitstream, as are the original Grappler LQ fonts, and the package retails for $99.

Although you claimed to have problems with our spooler, we have found it to work in all the applications we've run. We'd like to know which ones caused problems for the reviewer.

Karl Seppala
Orange Micro
Anaheim, California

It's true that the Grappler LQ can print 300-dpi graphics, so long as the image is in the appropriate file format—QuickDraw for object images, a 300-dpi format for bitmaps. (PostScript files, of course, are specifically not supported, and these images print at screen resolution only.) As for the spooler, we tested it on a Mac Plus and an HP LaserJet Series II with Excel, Ragtime, Works, Scoop, and MacPaint, and we experienced intermittent system crashes with most of these applications.—Ed.

(continues)

THEIR LIST IS HIGH. AND SHORT.
OURS IS LOW. AND LONG.

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Key Features:*

All the standard drawing tools
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Ultra-fine hairlines
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Object libraries
± 32x magnification/reduction
Text rotation
High precision
8 available colors
Auto-dimensioning of lines

CANVAS™ 2.0

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Ultra-fine hairlines
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Smooth polygons
Object libraries
± 32x magnification/reduction
Text rotation
Much higher precision
16.7 million available colors
Auto-dimensioning of lines & arcs
Join & split smooth curves
PostScript® gray scales in 1° increments
Continuous Bezier Curves
Area & perimeter calculations
Powerful Auto-Duplication options
Central Object Control dialog
Skew, perspective & distort effects
Tear-away rulers
Magnetic guide lines
Complete set of bitmap editing tools
Import & export of TIFF files
Auto-tracing of imported bitmap images
72-2540 DPI. bitmap resolution
PixelPaint™ compatible color palettes
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From Mac to PC

I'm a programmer for a large insurance firm. I have to use IBM PCs and mainframes at work, but I prefer to use my Mac Plus at home. Is there an easy way for me to write programs on my Mac and send them to a PC in the office via modem?

Brendan Shea
Hartford, Connecticut

"A File-Transfer Primer" (in this issue) examines the various options for transferring files from a Mac to a PC. Fortunately for you, moving files from a Mac to a PC is easier than the other way around.—Ed.

Home Repairs

Somehow or other the upper drive in my SE was damaged. Having a machine that was out of warranty and being someone who enjoys tinkering, I cracked open the box and removed the drives. After noticing that the head was bent, I put the machine together and brought it in to the local computer store. There I was informed that Apple specifically (and the industry generally) does not sell repair parts; they sell disk drives. So instead of paying approximately $15 for a part (plus labor for installation and testing), I was forced to pay $160 (plus $40 labor and tax). I know that my old drive will go back to Apple for repair. Why does Apple find it necessary to wring the public?

Sterne A. Roufa
Buffalo, New York

Disk drives are such complex machines that even qualified Mac technicians don't work on them; that's why they send all damaged drives back to Apple. For the money you pay, you get a refurbished drive that's been completely tested and is guaranteed to be up to specifications. —Ed.

More on SE Screen Jitters

Apple does have a repair policy with regard to the noisy SE fan and screen jitter [*Letters,* November 1988]. Our repair shop told us that SEs with serial numbers preceeding F749xxxx may suffer from screen jitter. Both our SEs have lower serial numbers, and one had screen jitter. We had to pay to have the fan replaced because Apple does not consider the noisy fan to be a problem. However, the SE with the screen jitter was fixed free of charge. We were told the problem was caused by components on the analog board and not by the fan.

Darrell Hoffman
Carrollton, Texas

You're right. Apple now offers free repair through its dealers but only in cases where screen jitter occurs.—Ed.

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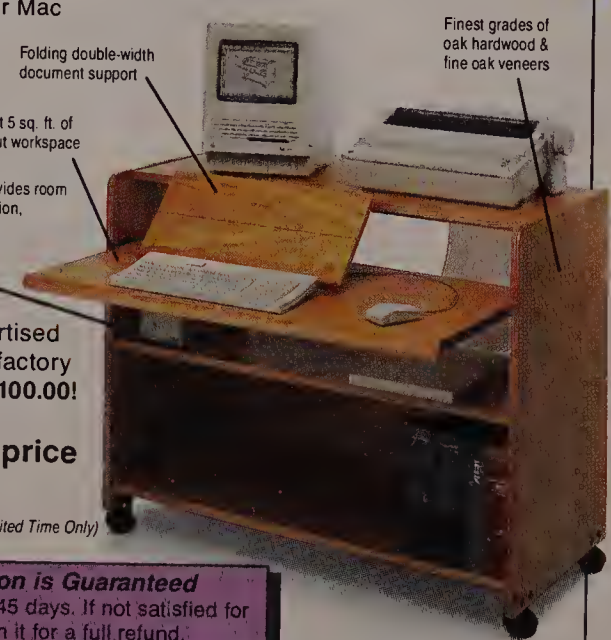

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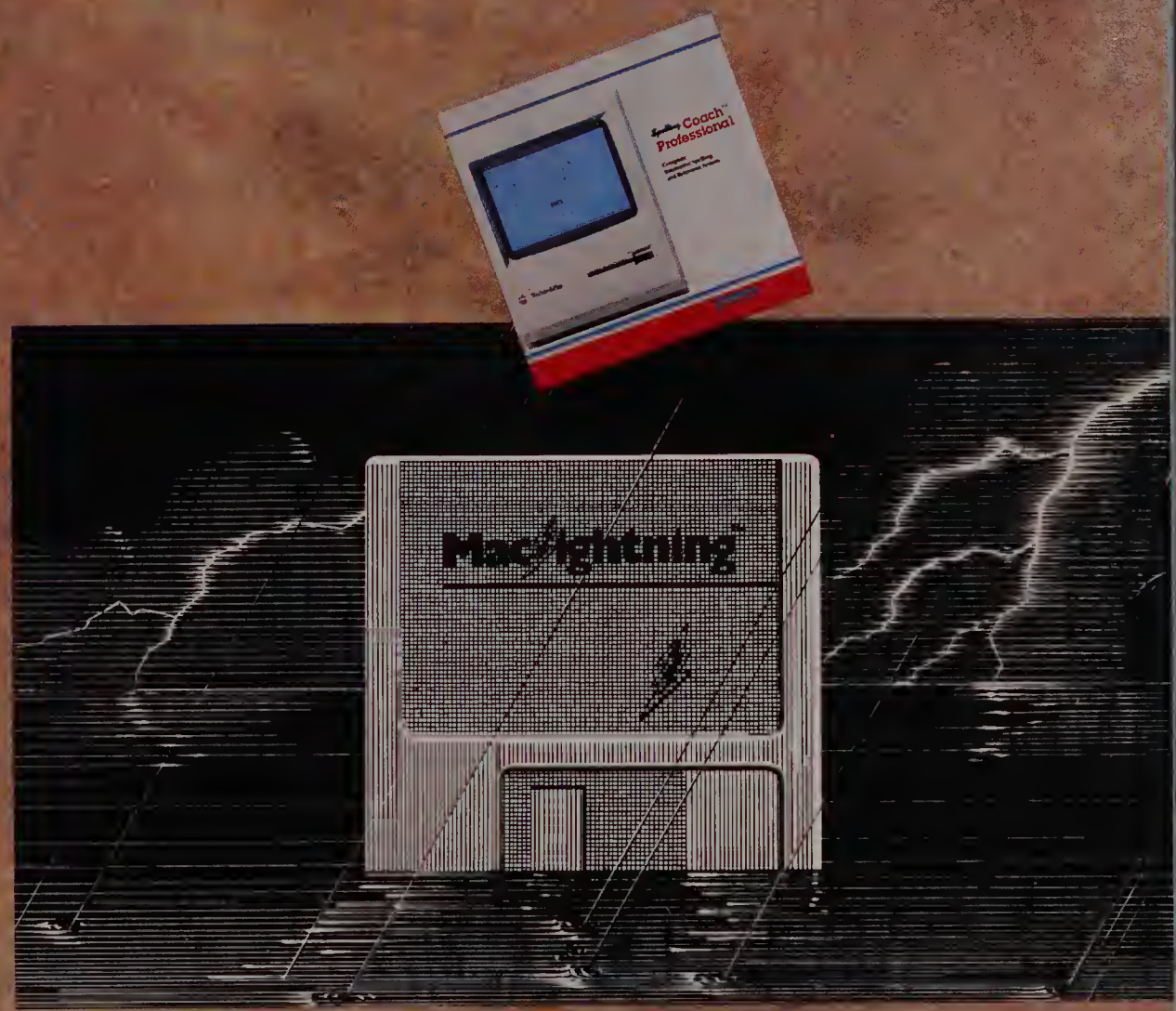

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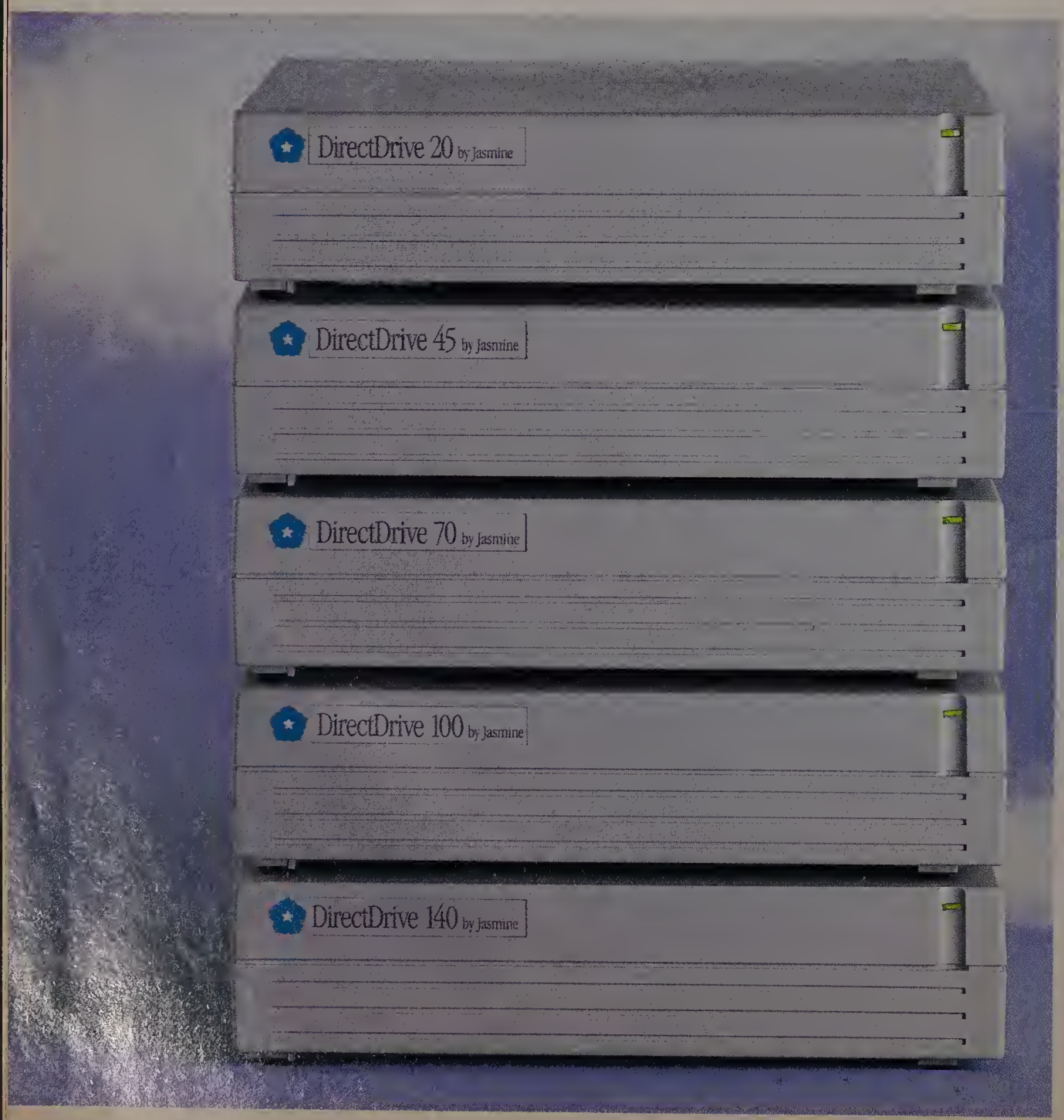

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Circle 457 on reader service card

David Bunnell

As Long As You're Up, Get Me a Game

All work and no play makes us dull indeed, but the Mac offers an antidote.

Remember a few years back when untold numbers of serious computer users looked down their noses at the Macintosh and pronounced that it was nothing but a toy—or worse, a *yuppie computer?* Not suited to real applications, the Mac was obviously meant for those neophytes who liked to draw pictures and play games.

If you weren't there, you probably can't imagine how pervasive Mac bashing was, or how frequently Macintosh users had to defend themselves for making that choice. If you did admit to owning one of those cute little critters with the puny 128K RAM and utter lack of software, you probably avoided bumping into Lotus power users at the office water cooler.

To counter the Macintosh's youthful image, Apple Computer, many Mac enthusiasts, and even publications like this one began to emphasize more heavily a growing number and variety of serious Macintosh applications, and chose to ignore the fun stuff. I know this is true, because at *Macworld* I was among those who deliberately took part in changing the course.

As a result, games and creative applications like music generators and graphics and animation programs received little ink.

Meanwhile, of course, the Mac has become a much more powerful, expandable, serious machine, supported by megatons of useful business software. Its image has changed dramatically. Are you, however, among those who know that the Mac can still be fun? That there are lots of great programs that you can play with and learn from all at once?

I made this discovery one evening, after spending too many hours staring at Excel spreadsheets. Punchy from looking at numbers, I popped a new game called Hidden Agenda into the slot. Hidden Agenda is an interactive simulation program from Springboard, in which the player becomes the newly elected president ("Presidente Incognito") of a mythical Central American country ("Chimerica") that has just overthrown its dictator.

Four or five hours later, when I had finished playing Hidden Agenda for the third time, I realized that I had learned a good deal about what it might be like to run a Central American country. I also learned that a good educational program doesn't need to be very elegant to be effective. Though the graphics for the game are crisply designed, Hidden Agenda's real assets are its research, logic, and clearly written instructions.

The central image on the screen is the president's desk, from which you can read Chimerican newspaper reports; keep track of your decisions and meetings with members of the cabinet, the military, diplomats, bankers, church officials, labor organizers; and so on. You try to steer a political course that accomplishes the goals you think are most important for the country—and as president, you get to choose.

From a programming perspective, Hidden Agenda does nothing to advance the state of the art. Its beauty lies not in the technology, but in the content. The game's designer and writer, Jim Gasperini, really knows his subject. The cast of characters, political affiliations, and potential problems all bring to mind the news we get about various situations in Central America. If you choose to meet with the bishop he'll ask you to jail the military men allegedly responsible for rural terrorism. If the Popular Stability party member you've chosen for a cabinet post clashes with the Christian Reform party member you've chosen, you must deal with how that affects the political climate. And don't forget that you must monitor Chimerica's high infant mortality rate, as well as meet with the coffee growers and the campesinos.

After playing through the sequence you know you've had fun, but you also get the sneaking suspicion that you've been tricked into taking a college-level political science seminar on developing a stable government in a shaky region. After a couple of hours of balancing political forces from the right, left, and center while attempting to keep the economy healthy and the majority of the people happy, I really did get a deeper understanding of the Central American dilemma. Mission accomplished: the same machine I had been grinding away on provided some welcome relief, and I was ready to go back to the serious stuff.

The moral of the story is to remember that the Mac is still up for having fun if you are. And the graphics and interactive capabilities of many of the games available today are inviting and clever as well as instructive. So take a break from the usual toil of project management, databases, or spreadsheets. You have nothing to lose but your self—for a little while, anyway.

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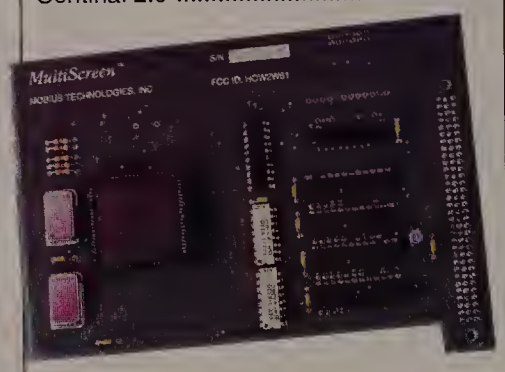

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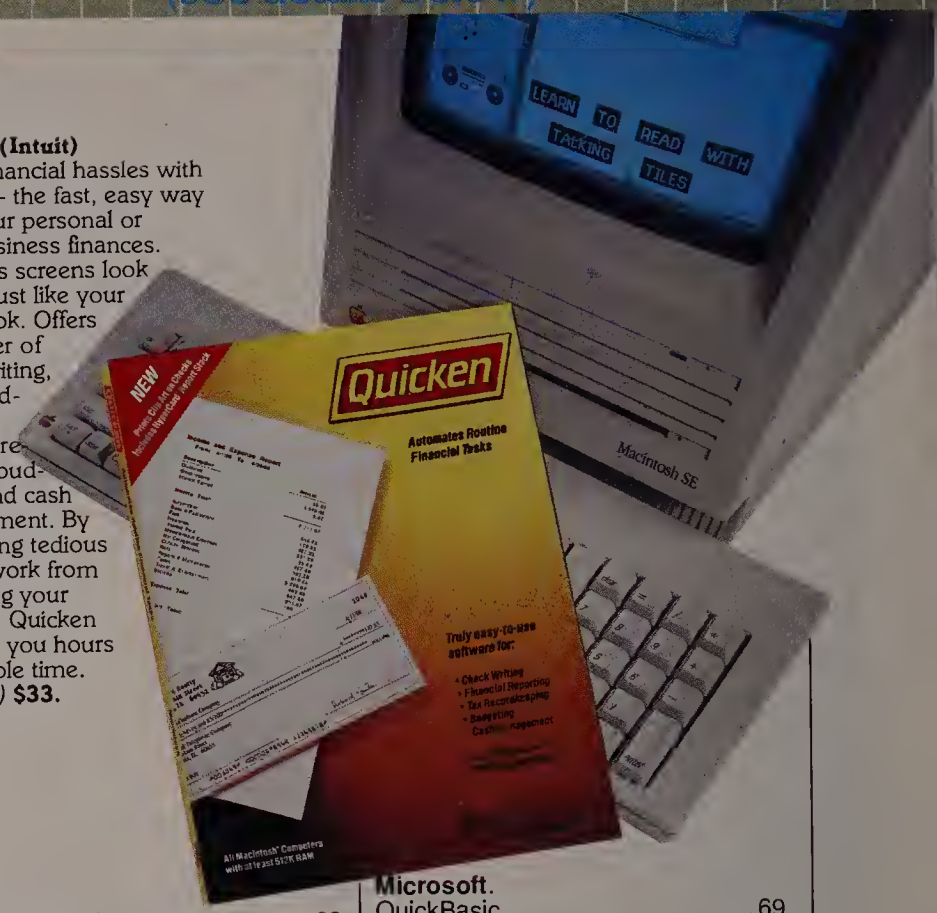

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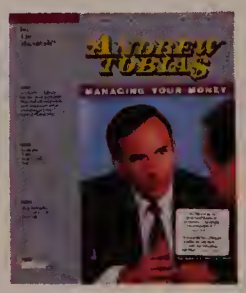

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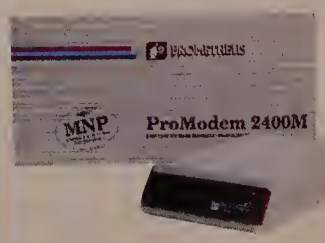

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New Business Clip Art.
Create professional presentations with over 150 sharp, contemporary PostScript Images. Contains computers, occupational and public symbols and much more! *(graphics)* **$69.**

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Illustrator 88 ... 309.
Streamline ... Call.
Aldus
PageMaker 3.0 ... 399.
Broderbund
DTP Advisor ... 47.
Letraset
Image Studio or Ready,Set,Go! ... 279.
Olduvai
Read-It! 2.0 *(OCR)* ... 199.
Quark
Xpress or QuarkStyle ... Call.
Solutions
SuperGlue 1.05 ... 52.
Springboard
Springboard Publisher ... 109.

NETWORKING PRODUCTS

Connect Inc.
MacNet ... 43.
Farallon
Timbuktu 2.0.1 ... Call.
SuperMac
Network DiskFit ... 199.
TOPS
TOPS 2.1 ... 149.

FONTS

Adobe
Fonts (All Avail.) ... Call.
Altsys
Fontastic Plus 2.0 ... 54.
Letraset
LetraStudio ... 289.
LetraFonts *(various)* ... ea 59.
Olduvai
ArtFonts ... 59.

CAD/CAM

Graphsoft
MiniCad Plus ... 525.
Innovative Data
MacDraft ... 149.
Dreams ... 279.
Micro CAD/CAM
MGMStation *(professional CAD)* ... Call.

FINANCIAL AND ACCOUNTING SOFTWARE

Aatrix
Payroll 3.5 ... 99.
Payroll PLUS ... 159.
Bedford
Simply Accounting ... 219.
Chang Labs
Rags to Riches 3 pk 3.1 ... 289.
Intuit
Quicken ... 33.

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This revolutionary upgrade sets the standard for drawing programs by blending powerful drawing capabilities with convenient easy-to-use paint features. Features include autotrace, multi-point Bezier curves, unlimited layers, 16.7 million colors for 24-bit Mac II support, hairlines to 1/1000th of an inch, improved precision to 64,000 dpi, PostScript gray scales in one-degree increments, TIFF and bitmap editing, and zoom capacity ranging from 3% to 3,000%. *(graphics)* **$159.**

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MECA
Managing Your Money ... 128.
Monogram
Business Sense ... 279.
Softview
MacInTax Federal '88 ... 69.
TaxView Planner ... 64.
Survivor
MacMoney 3.02 ... 62.

STATISTICAL ANALYSIS

Abacus Concepts
StatView II ... 349.
StatView SE+Graphics ... 229.
BrainPower
StatView 512+ *(requires 512k)* ... 175.

D2 Software
MacSpin 2.0 ... 189.
Odesta
Data Desk Professional ... 289.
Paracomp
Milo ... 169.
Select Micro Systems, Inc.
Exstatix ... 219.
Software for Recognition Tech
MacEqn ... 24.

MUSIC AND SOUND

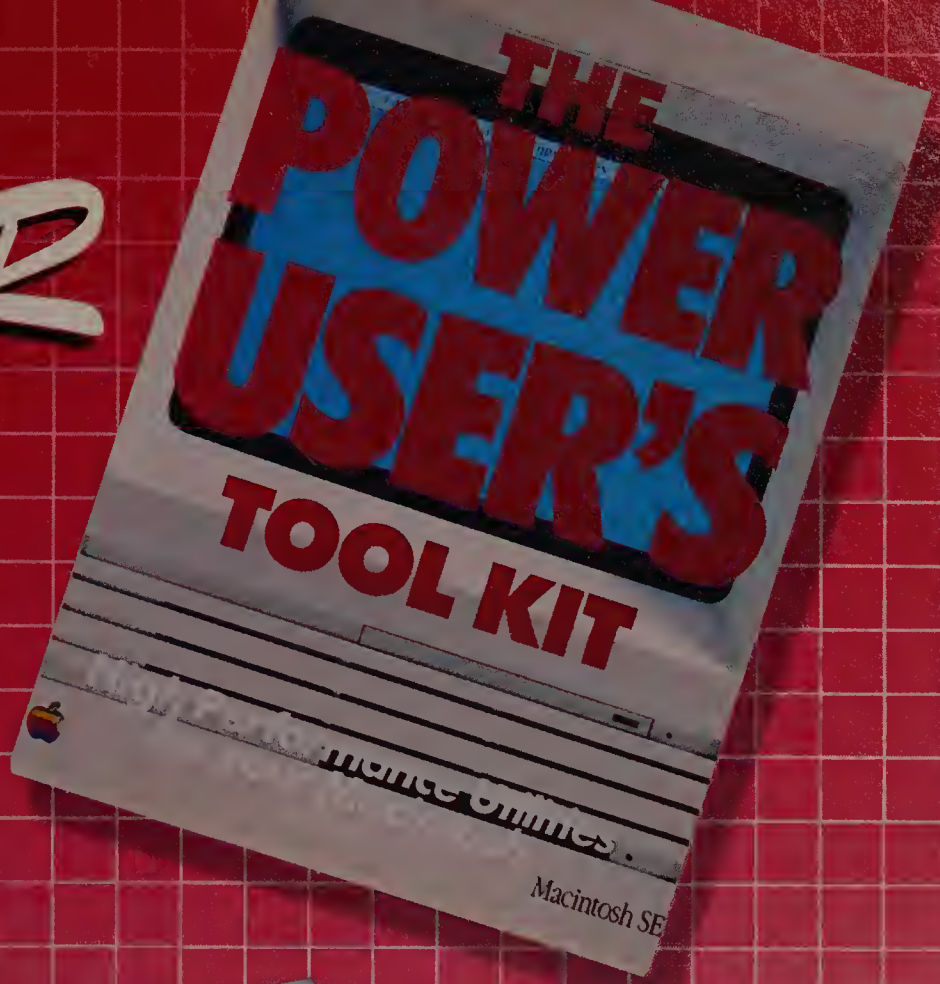
Altech
MIDI Interface ... 59.
MIDI Basic ... 30.
Coda
MacDrums ... 32.
Perceive ... 52.
Electronic Arts
Deluxe Music Construction 2.5 ... 84.
Farallon Computing
MacRecorder *(records sound)* ... 139.
Great Wave
ConcertWare + MIDI 4.0 ... 79.
Impulse
Audio Digitizer w/SoundWave ... 145.
Intelligent Music
OvalTune ... 95.
Opcode Systems
Music Mouse ... 39.
Passport Designs
Master Tracks Pro ... 259.
NoteWriter ... 169.

EDUCATIONAL/ PERSONAL

Artworx
Linkword Languages (Sp, Fr, Ger)ea 25.

2400II Internal Modem (EPIC Technology, Inc.)
This internal modem for the Mac II can tap into any database, electronic mail or service bureau. Features auto dial/auto answer, call progrress monitoring, software controlled speaker, choice of tone or pulse dialing and redial on busy. It's voice/data switchable and has a self-test mode. Comeswith a 5 Year Manufacturers Warranty. *(drives)* **$315.**

FREE OFFER



The MacWarehouse technical staff and the publisher of the popular Power User's Manual have put together a great new disk of utilities, desk accessories and applications. THE POWER USER'S TOOL KIT. Seventeen great programs, including a powerful word processor that you can install as a desk accessory.

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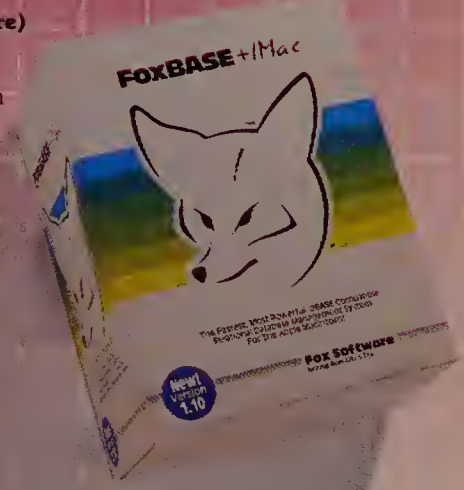

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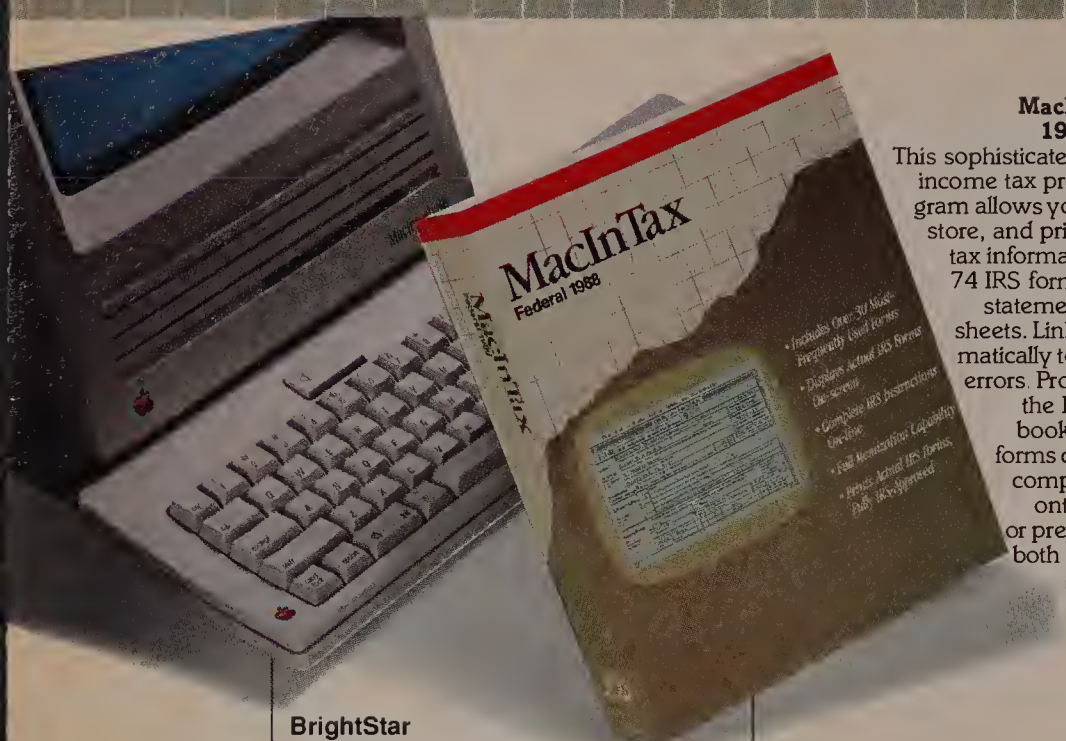

MacInTax Federal 1988 (Softview)
This sophisticated, easy to use income tax preparation program allows you to organize, store, and print out income tax information. Includes 74 IRS forms, schedules, statements and worksheets. Links forms automatically to reduce input errors. Program features the IRS instruction booklet on-line. All forms can be printed, complete with data onto blank paper or preprinted forms, both IRS approved. *(finance)* **$69.**

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Talking Tiles ..... 69.
Bootware Software
ResumeWriter Pro ..... 75.
Broderbund
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Math Blaster ..... 27.
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Typing Tutor IV ..... 35.
The Software Toolworks
Mavis Beacon Teaches Typing ..... 35.
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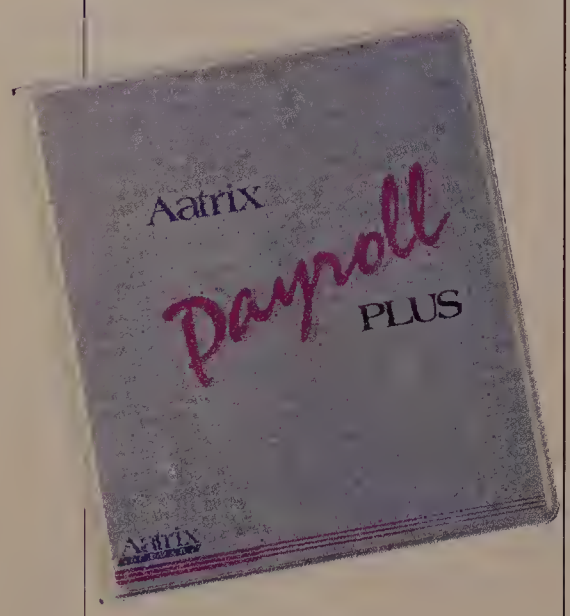
HyperCard Getting Started ..... 35.

Payroll Plus (Aatrix Software)
Handle unlimited numbers of employees. Manage the payroll from up to ten different income sources or rates. It prints form 1099 and writes miscellaneous checks. You can itemize and accumulate straight time, overtime, doubletime, vacation, holiday and sick pay. Even handles the accounting for commissioned sales people, contractors and consultants. A must for managers of larger companies! *(finance)* **$159.**

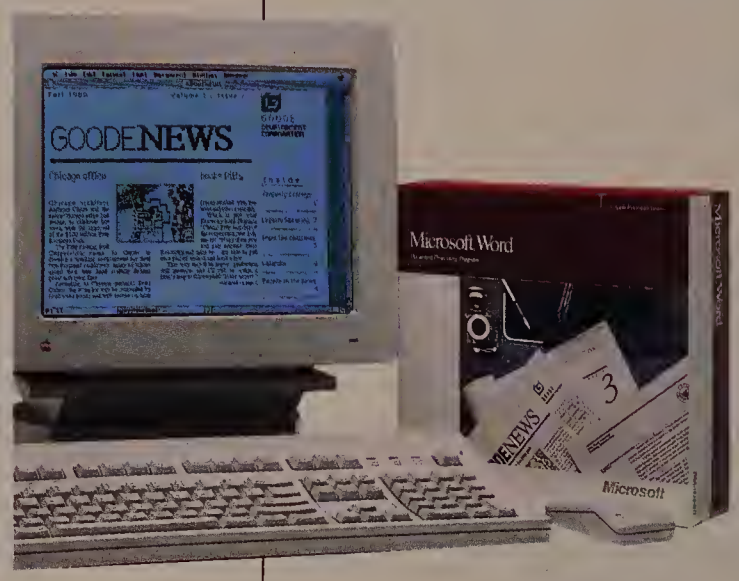


PageMaker 3.0 Video Tape ..... 35.
Word 4.0 Video Tape ..... 35.

GAMES

Access Software Inc.
World Class Leader Board ..... 34.

Word 4.0 (Microsoft)
Word 4.0 adds new page design capabilities! Create newsletters with multiple columns. Automatically wrap text around graphics. Tables are a breeze. Use Style Sheets to create tables with self-calculating columns. Word 4.0 has a spelling checker, hyphenation, glossary, mail merge, and automatic indexing. Word 4.0 also includes SuperPaint 1.1 at no extra charge. *(word processing)* **$249.**



Artworx
GrailQuest ..... 19.
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Ancient Art of War At Sea ..... 27.
Shufflepuck Cafe ..... 24.
Where in the World is Carmen San Diego ..... 27.
Bullseye
Ferrari Grand Prix or P51 ..... ea 32.
Casady & Greene
Crystal Quest 2.2 w/Critter Editor ..... 42.
Centron Software, Inc.
BlackJack or CrapsMaster ..... ea 27.
CasinoMaster *(5 pack)* ..... 55.
Discovery Software
Arkanoid ..... 27.
Electronic Arts
Starfleet I: The War Begins ..... 37.
Chuck Yeager Adv. Flight Trainer ..... 32.
Epyx
Sub Battle Simulator ..... 29.
Infocom
Leather Goddess of Phobos ..... 15.
Mindscape
Balance of Power, Deja Vu ..... ea 30.
Shadowgate, Uninvited ..... ea 30.
Nemesis
Go Master ..... 49.
Joseki Tutor ..... 30.
PCAI
MacCourses ..... 29.
MacGolf 2.0 ..... 35.
MacGolf Classic ..... 54.
Road Racer ..... 41.
Sierra ON-Line
Leisure Suit Larry ..... 23.
Silicon Beach
Apache Strike, Dark Castle ..... ea 27.
Beyond Dark Castle ..... 27.

Simon & Schuster
Star Trek:Kobayashi Alternative ..... 24.
Spectrum HoloByte
Falcon 2.0 ..... 32.
PT109 or Gato ..... ea. 26.
Solitare Royale or Tetris ..... ea 20.
The Software Toolworks
Chessmaster 2100 ..... 32.
Life & Death ..... 34.
The Hunt for Red October ..... 29.

DISK DRIVES/ MEMORY UPGRADES

1 MEG SIMMS ..... Call.
AST
Mac286 Co-Processor *(Mac II)* ..... 1079.
CMS
CMS TapeStack 60 Meg ..... Call.
MacStack 20 Meg ..... 569.
MacStack 40 Meg ..... 789.
MacStack 60 Meg ..... 849.
Cutting Edge
800K Disk Drive "NEW" ..... 175.
Wedge XL 30 Plus ..... 579.
Wedge XL 45 Plus ..... 729.
XL 30 Internal or 45 Internal ..... Call.

Dayna Communications
DaynaFile single 360K *(5 1/4")* ..... 529.
Dove
MacSnap 2S ..... 750.
MacSnap 2SE ..... 439.
MacSnap 4S ..... 1488.
MacSnap 8S ..... 2975.
MacSnap SCSI Interface Port ..... 109.
MacSnap 524E *(512k to 1 meg)* ..... 289.
MacSnap 524S ..... 379.
MacSnap 548E *(512k to 2 meg)* ..... 549.
MacSnap 548S ..... 599.
MacSnap Plus 2 ..... 439.
MacSnap 1024 Mem. Exp. Board . Call.
MaraThon SP ..... 189.
MaraThon Accelerators ..... Call.

Arkanoid (Discovery Software)
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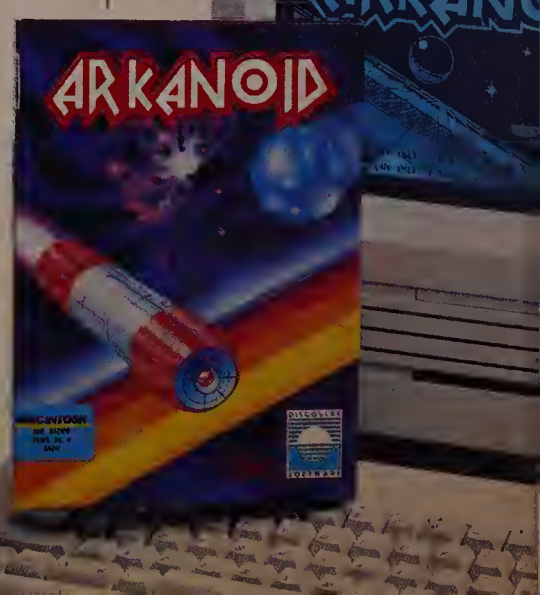
FastBack
Now you can take all your key files on your next business trip! FastBack is a high speed backup program that copies data from hard disk to standard floppies at a rate of 1Mb per minute (or better!). Also features Error Correction Codes. *(utilities)* **$54.**

GOfer (Microlytics)
The high speed text-retrieval accessory from Microlytics. Summon GOfer with one keystroke to search out information in your disk files. Enter one or two words and have a document at your fingertips within seconds! Works with almost any file. *(utilities)* **$44.**

C.A.T. 2.0
Automate activities with this relational database designed to manage Contacts, Activities and Time. Plan activities, do forecasting or scheduling for the future. Import and share data among multiple users. Database, mailmerge/text and calendar functions in one easy to use program. *(database)* **$229.**



FROM MacWAREHOUSE

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EMAC 20D Deluxe *(O footprint)* ..... 585.
EMAC 40D Deluxe *(O footprint)* ..... 995.
EMAC 60T *(tape backup)* ..... 895.
EMAC FS-102 ..... 2495.
Impact Hard Drives ..... Call.

MAC - 101 Keyboard (Data Desk)
Features 101 keys including a numeric keypad, a separate T-shaped cursor keypad, Cancel Key, Option and Command keys at both ends, definable function keys, plus scrolling, page control, and zooming keys. Comes with free macro software and manufacturer's two year warranty. *(input/output)* **145.**

La Cie Ltd.
3.5 Mounting Kit w/SilverServer ..... 99.
Cirrus Drive Kits ..... Call.
MiniScribe
20Mb Raw Int. Drive Kit ..... 379.
45Mb Raw Int. Drive Kit ..... 549.
Mobius
MultiScreen Video Card ..... 349.
PCPC
MacBottom HD21 (SCSI) ..... 659.
MacBottom HD32 (SCSI) ..... 699.
MacBottom HD45 (SCSI) ..... 859.
MacBottoms w/Modem ..... Call.
Peripheral Land, Inc.
Infinity Turbo 40 Meg ..... 1299.
UniMac
3.5 or 5.25 Int. Mounting Kits ..... Call.
Storware ..... 69.

MODEMS

Abaton
InterFax12/48 ..... 329.
Best Data Products
SmartOne 2400/1200 with cable and software ..... 169.
EPIC Technology
2400II Internal Modem ..... 315.
Everex
EMAC 2400 ..... 225.
Hayes
Smartmodem 1200 ..... 299.
Smartmodem 2400 ..... 449.
Smartmodem 9600 *(V series)* ..... 985.
Migent
Pocket Modem *(ext. 300/1200 baud)* 115.
Prometheus
Promodem 2400 ..... 309.
Promodem 2400M ..... 199.
Shiva
NetModem 1200 ..... 359.
Supra
Supra Modem 2400 ..... 149.
US Robotics
Courier Modems ..... Call.

BLANK MEDIA

B.A.S.F.
DS/DD *(box of 10)* ..... 17.
Sony
DS/DD *(box of 10)* ..... 19.
SS/DD *(box of 10)* ..... 13.

INPUT/OUTPUT

Cutting Edge
CE-105 ADB Keyboard ..... 125.

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The Mac's most powerful paint DA now bundled with the Mac's most powerful draw DA-includes Auto-Trace, Browse and on-line help. MacPaint, compatible. *(graphics)* **$69.**
ZBasic 5.0 (Zedcor)
New and improved version - 256 colors, all toolbox routines and MS basic conversion program now bundled with The Program Generator, a draw-like editor that takes the grunt work out of writing REAL Macintosh applications *(language)* **$99.**

DataDesk
Mac 101 Keyboards ..... 145.
Kensington
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IS/ADB Tablet ..... 259.
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Mouse Systems
A+ Mouse *(512/Plus or SE/II)* ..... Call.
New Image
MacScan *(flatbed)* ..... 1749.
Seikosha America
Seikosha Printer *(dot-matrix)* ..... 235.

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Summagraphics
Bit Pad Plus ..... 329.
ThunderWare
LightningScan ..... Call.
ThunderScan 5.0 ..... 189.

ACCESSORIES

Amaray
MediMate Flex Pac ..... 12.
Computer Friends, Inc.
MacInker *(IW & IW II)* ..... 41.
Ergotron
MacTilt or MacTilt SE ..... 68.
Mouse Cleaner 360 ..... 15.
I/O Designs
ImageWare II Carrying Case ..... 49.
ImageWriter LQ Ribbon ..... Call.
IW II Ribbons-Black or Color ..... Call.
Macinware Plus Carrying Case ..... 64.
Macinware SE Carrying Case ..... 75.
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Modem/FAX Protector 20 ..... 25.
PowerTree SurgeProtectors ..... Call.
System Saver ..... 64.
Mobius Products
Fanny Mac QT ..... 65.
SE Silencer ..... 39.
Omnium Corporation
Mac Desktop Workstation ..... 75.
Orange Micro
Grappler L/Q or LS ..... Call.
Targus, Ltd.
Deluxe Plus/SE-XKB Case (black) .. 69.
ImageWriter II Case (black) ..... 49.
Mac Plus/SE Case (black) ..... 59.

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Introducing the First Mac Clone

Is this Macintosh work-alike too good to be true?

MAX SEABAUGH

by Steven Levy

The daunting words "it can't be done" are sometimes perversely provocative. All too often that forbidding phrase generates a chorus of echoes and becomes a law unto itself. At times, though, people regard those words as a gauntlet cast at their feet, a glove flicked sharply against their cheek, a rebuke that must be addressed. It *can* be done, they vow. And they do not slumber soundly until they do it: split the atom, circumnavigate the globe, cure polio, harness electricity, shrink a mainframe computer to one on a personal scale, or, in this case, manufacture a low-cost, lawsuit-proof, better-than-the-original, Macintosh work-alike.

Yes. A new era of Macintosh computing has begun, and this nascent golden age is occurring without any assistance from Apple Computer.

Getting the Scoop

Surprised? Not nearly as much as I was recently when I received, in short order, not one but two overnight dispatches from a well-known PR firm. Both requested my presence at a New York hotel room at a certain date and hour, and both were stuffed with those onerous nondisclosure forms binding me to complete silence about what I had seen until a time my handlers deemed propitious. I sent the forms back with a note explaining that I could not take a vow of silence until I had some idea of what I wasn't supposed to talk about.

Then a big cheese from the firm called, asking me to lunch. Fine, I said, so long as I could name the place. So at Grand Central Station's Oyster Bar I learned that mysterious industry mavens had designated this column as the exclusive source of information on their new product—but only if I would sign the forms and keep my mouth shut during the period between when I saw the product and the publication date of our April issue.

Knowing that this PR firm had extensive dealings with a certain Northwest software concern, I tried to ferret out the information with no obligation on my part. "What's Microsoft up to?" I asked. "Another stab at desktop publishing?"

"It's not Microsoft," the big cheese answered. "Well, maybe it is. They're involved. But it's not their product. You're not even close."

Then the power luncher glanced nervously around us. "Look, you idiot,"

(continues)

Steven Levy is a Macworld *columnist and the author of* The Unicorn's Secret: Murder in the Age of Aquarius *(Prentice-Hall, 1988).*

Results:Winning Trades

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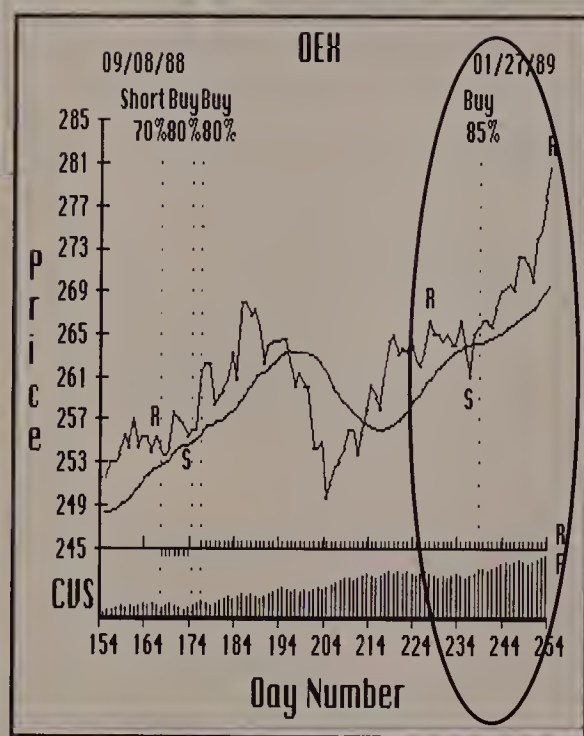

Daily Data for:OEX

#	Date	Day	%	Rec	Price	Pr Chg	S-R	Trend
239	01/06/89	Fri	85%	BUY	$266.21	0.67	---	Rising
240	01/09/89	Mon		Hold	$266.46	0.25	---	Rising
241	01/10/89	Tue		Hold	$265.67	-0.79	---	Rising
242	01/11/89	Wed		Hold	$267.44	1.77	---	Rising
243	01/12/89	Thr		Hold	$268.90	1.46	---	Rising
244	01/13/89	Fri		Hold	$269.35	0.45	---	Rising
245	01/16/89	Mon		Hold	$269.61	0.26	---	Rising
246	01/17/89	Tue		Hold	$269.01	-0.60	---	Rising
247	01/18/89	Wed		Hold	$272.24	3.23	---	Rising
248	01/19/89	Thr		Hold	$272.42	0.18	---	Rising
249	01/20/89	Fri		Hold	$271.66	-0.76	---	Rising
250	01/23/89	Mon		Hold	$269.92	-1.74	---	Rising
251	01/24/89	Tue		Hold	$274.16	4.24	---	Rising
252	01/25/89	Wed		Hold	$274.72	0.56	---	Rising
253	01/26/89	Thr		Hold	$277.64	2.92	---	Rising
254	01/27/89	Fri		Hold	$280.70	3.06	Res	Rising

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Symbol	Type	Date	Quant	Purch Price	Comm /Buy	Orig Cost	Today's Price	Comm /Sell	Today's Value	P/L
OEX-BM	Calls	1/9/88	100	$7.125	$285.94	$71,535.94	$17.25	$564.38	$171,935.63	$100,399.69

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she whispered testily, "I'm giving you an exclusive on the Macintosh clone! Are you going to sign or should we call Dvorak?"

I signed.

Gates of Eden

A week later I was knocking on the door of a Plaza suite. It was opened by none other than Microsoft chairman Bill Gates.

"Hi, come on in," he said; as usual he was bouncing around with nervous, almost impatient creative energy. Spread around the suite were a bunch of guys in black suits. I mentioned that I didn't know any of those fellows and Gates shrugged. "It's not superimportant for you to know everyone here. These two are lawyers," he motioned. "This one's a security guard. A couple are hardware guys from the manufacturer."

"Who is the manufacturer?" I asked.

"We'll get to that," Gates said. "First, look at this." He led me to a desk covered with a white sheet. On a signal from Gates, one of the suited men pulled the sheet. There stood a metallic-blue piece of technology, the size of a MacBottom hard disk but perhaps twice as high. It had a floppy disk slot on the right. On the left, where a logo might be, someone had stuck a piece of first-aid tape, but as I reached for it the security guard caught my hand. (I knew he was a guard thanks to his aviator sunglasses.)

"All in good time," said Gates, rummaging around in a large box. He pulled out a sleek, one-button mouse, which he plugged into the right side of the machine. "There's a slot on the left side, too, for southpaws," he noted. Then he pulled out a keyboard that looked like the deluxe Apple keyboard—fondly dubbed by its adherents "the barge"—but, thankfully, less wide. "ADB-compatible, of course," Gates said. "Apple keyboards work off the shelf with this machine. You won't use Apple's, though—we don't make you pay extra for ours."

He reached into the box and pulled out a compact monitor with a 12-inch

(continues)

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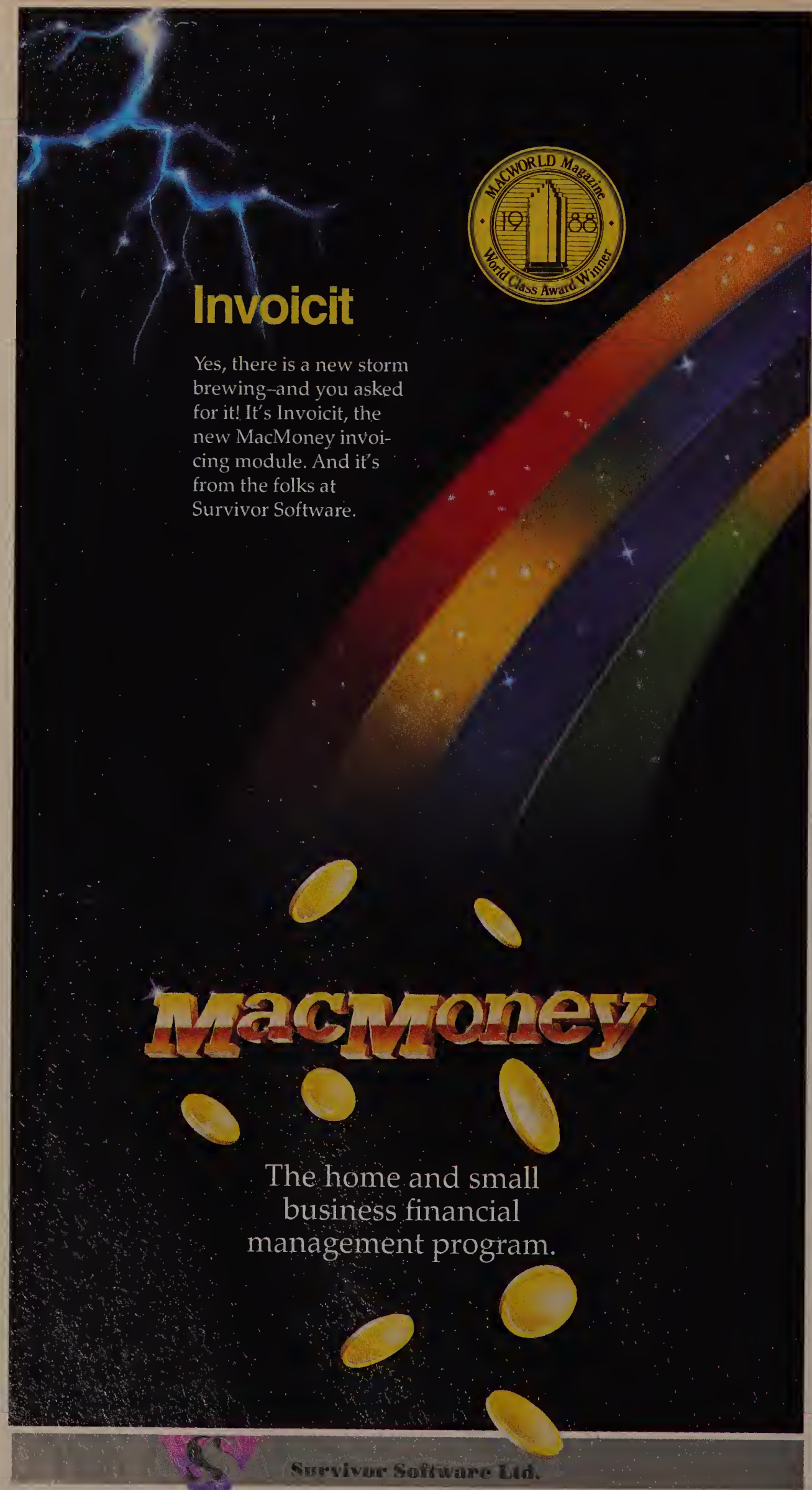

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Circle 112 on reader service card

display. He placed it on the main unit, then grabbed a cord from the box and plugged the monitor into the back of the unit. He typed something on the keyboard—"personalized password," he noted—and the screen came to life.

It was a very sharp monochrome display of almost cinematic quality. It said "Welcome to Apple-Killer."

Gates flushed, then smiled sheepishly. A couple of the suits—obviously, the lawyers—began to make choking noises. "Well, of course that's not what you'll see in the release version," Gates admitted. "I think one of our programmers got a little rambunctious." By then we had heard the familiar hard-disk whirr, and the screen showed the familiar Macintosh desktop—complete with menu bar, folders, and Trash Can.

Legal Matters

"How can you get away with that?" I demanded. "That's exactly the Mac interface!"

"Let me explain what's in here," Gates said. "Just as companies have managed to make work-alike versions of IBM's PC-DOS, our programmers, on contract from the manufacturer, have created a ROM that acts just like the Macintosh version. We were careful not to use any programmers who had ever worked with the Mac. It was supertough finding hackers who had never cracked open *Inside Macintosh*, but we finally figured out where to find them—they worked for certain Fortune 100 companies that forbade their programmers to go near Apple products. We lured these guys away and they've been working for years to make sure this machine acts just like a Macintosh does when it sees Macintosh software. We don't run into legal trouble because the software is Apple software—the System, the Finder, and so on. We don't include that with the computer, but the users will get it from the applications they buy, or they'll buy it from Apple in those upgrade kits they sell for $50 and distribute to user groups."

"That's ingenious," I conceded. "But what happens if Apple changes its ROM chips?"

(continues)

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The Iconoclast

"Well, Apple can't change them too much, or it makes all its current computers obsolete. But considering how Apple loves to reorganize, we figure that's inevitable anyway. Unlike all those Macintoshes, though, our computer won't require dealer servicing to put in a new ROM. We'll supply a new one and the owner can just snap open the case and replace the chip."

I paused for a moment, puzzled. Snap open the case?

Gates was way ahead of me. He shut the machine off, moved the monitor, and unsnapped something in the back of the computer. The case opened, and all the innards were revealed.

"We used a lot of VLSI to keep the size down," Gates said, launching an inspection of the electronics. "This is that snap-on ROM I mentioned. Oh yeah, we have Works on this ROM chip here, and as soon as it's ready—real soon now—we'll put Word 4.0 in, too. Here are the memory chips—we come with 4 megabytes, standard. Here's the 68030 chip—incidentally, this machine runs about twice as fast as a Mac IIx. And this is a one-third-height hard disk, 60 megs. Here's a slot for a card, though you probably won't need one—we've built in a 2400-baud modem. And this chip here allows you to send or receive directly from fax machines. See, here's the fax connector in the back, right next to the built-in MIDI port."

He sighed. "Actually it was a disappointment that we didn't have a 9600-baud modem and cellular telephone technology. But the manufacturer had a mandate to keep the price, with monitor, below $1000. We just couldn't include the modem and keep the price down."

A Dream Price

"Wait a minute," I said. "Are you telling me the configuration I'm looking at—that works like a Macintosh, but with a more powerful chip, more memory, fax technology, and a built-in modem—costs a thousand dollars?"

"Oh no," Gates said, "not this configuration. This configuration is $800. The $1000 version comes with *that.*" One of

the suits carried over a slightly bulkier monitor, which Gates plugged into the back of the machine. When he turned the unit on, the Apple-Killer screen came up again—only this time, in crisp, bright color.

I was stunned. "How could you do this?"

"Basically, our profit margins are lower. And we shopped wisely. For instance, take the memory chips. You'd think it would be hard to get plenty of DRAM chips at a low cost. But we just called up the suppliers that Steve Jobs lined up for his Next machine. Jobs's machine was so late that the suppliers were sitting with loads of chips, and they almost begged us to take the things off their hands."

I was speechless.

"I have to admit that even with the price like this, we're worried," said Gates. "We might be wrong—price might not be a factor at all. Look what's happening out there—right now you can buy a Mac Plus for a street price of about $1000 less than a Mac SE. Now everybody knows that there's almost no difference to the user between a Plus and an SE—yet people keep buying SEs! Even after Apple got greedy and raised the price.

"Maybe people like to get ripped off when they buy Apple computers. It's something we've had to think about. Yet the company that commissioned us to design this thing has studied the clone phenomenon very carefully, and they conclude that there will be a market for a superior Macintosh work-alike at a significantly lower cost."

Am I Blue

I couldn't stand the suspense. "What *is* this company?"

Gates smiled and said nothing. The men in suits smiled smugly. Suddenly I lurched for the machine, grabbing at the piece of tape covering the logo. One of the suits tried to stop me but I had

(continues)

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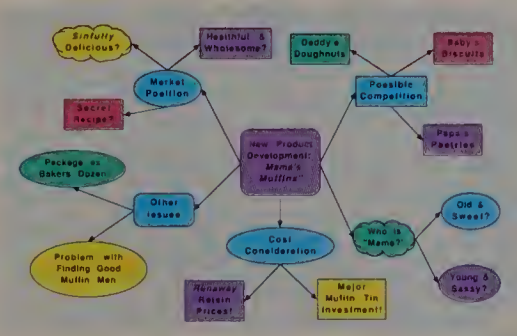

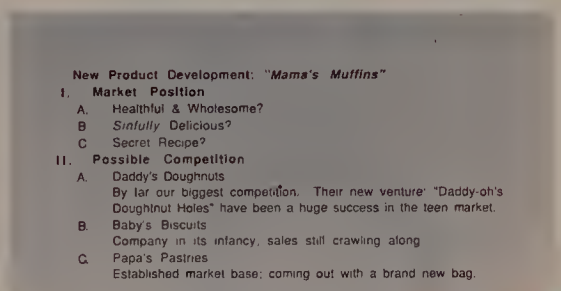

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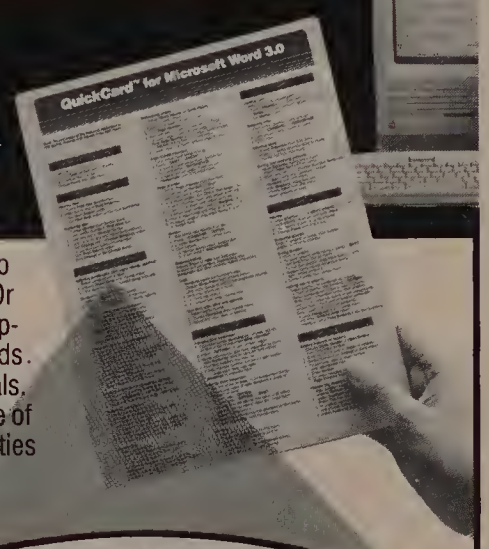

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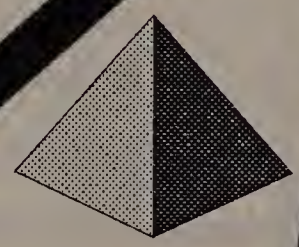

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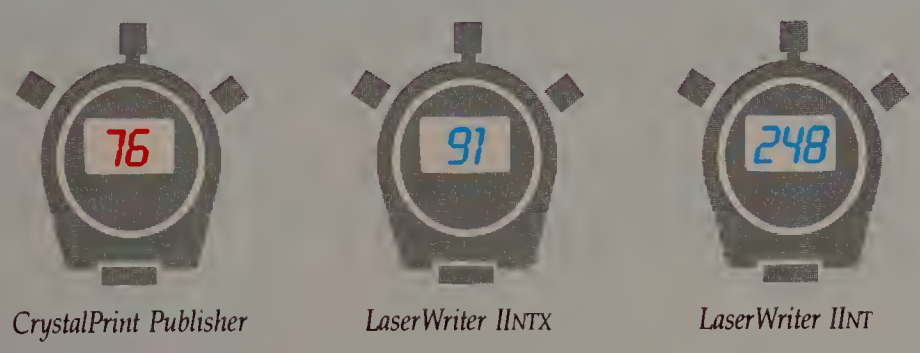

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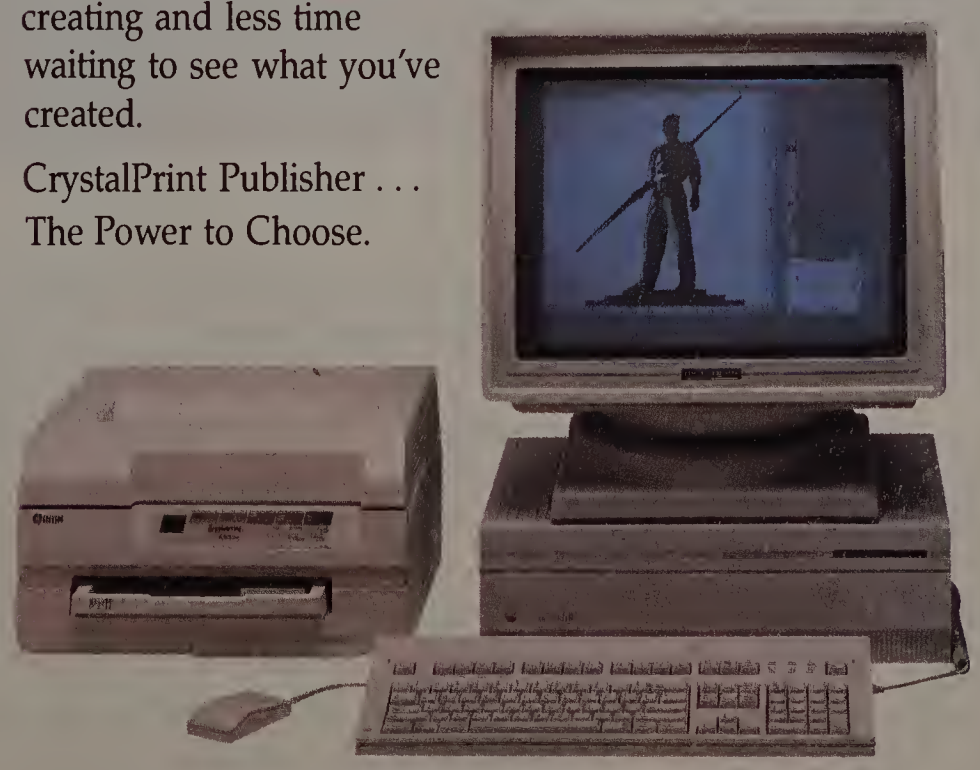

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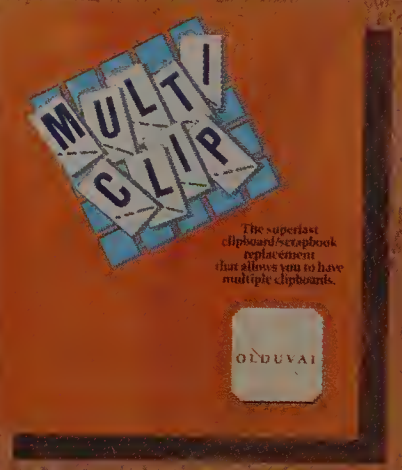

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already pulled off the tape, revealing a familiar blue, three-letter monogram.

"I would have told you eventually," said Gates. "But now you know."

"Well, I know, but I still find it hard to believe. A dream Macintosh—at a dream price. This whole thing seems too good to be true. Just tell me this, before I spill the story to my readers. Is this going to be another vapor product? A tease? A hoax? Can you give me a firm shipping date?" I asked

Gates smiled. "We sure can." He walked over to a television, flicked it on, and pushed a button on a VCR. "Just look at our ad, which will run on all three networks, selected independent stations, and with heavy rotation on MTV for a week beforehand."

The commercial shows scruffy people in jeans lining up in an orchard, with some sort of New Age music playing in the background. A scruffy youth is sitting behind a table at the head of the line, handing out apples (the fruit). Each person takes an apple and then walks off a cliff.

The camera pans to the rear of this line. At first we see only one or two people wearing suits. Then we notice more. The camera cuts back to the head of the line where a pair of guys in suits now man the table; as they give out apples they demand people's wallets before the short walk to the cliff. The New Age music becomes deafening. Suddenly from the distance comes a phalanx of Charlie Chaplin look-alikes wearing running shoes and carrying copies of Ted Nelson's *Computer Lib* book. They throw the books at the guys behind the table, literally upsetting the Apple cart. Everybody dances.

The screen goes black and these words appear:

"1989 won't be like 1984 anymore." The screen goes black again. A voiceover (is it Martin Sheen?) ominously finishes:

"IBM's Mac clone," says the voice, "shipping April first." □

Hatfield.

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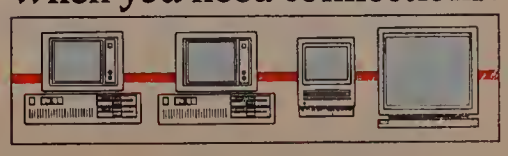

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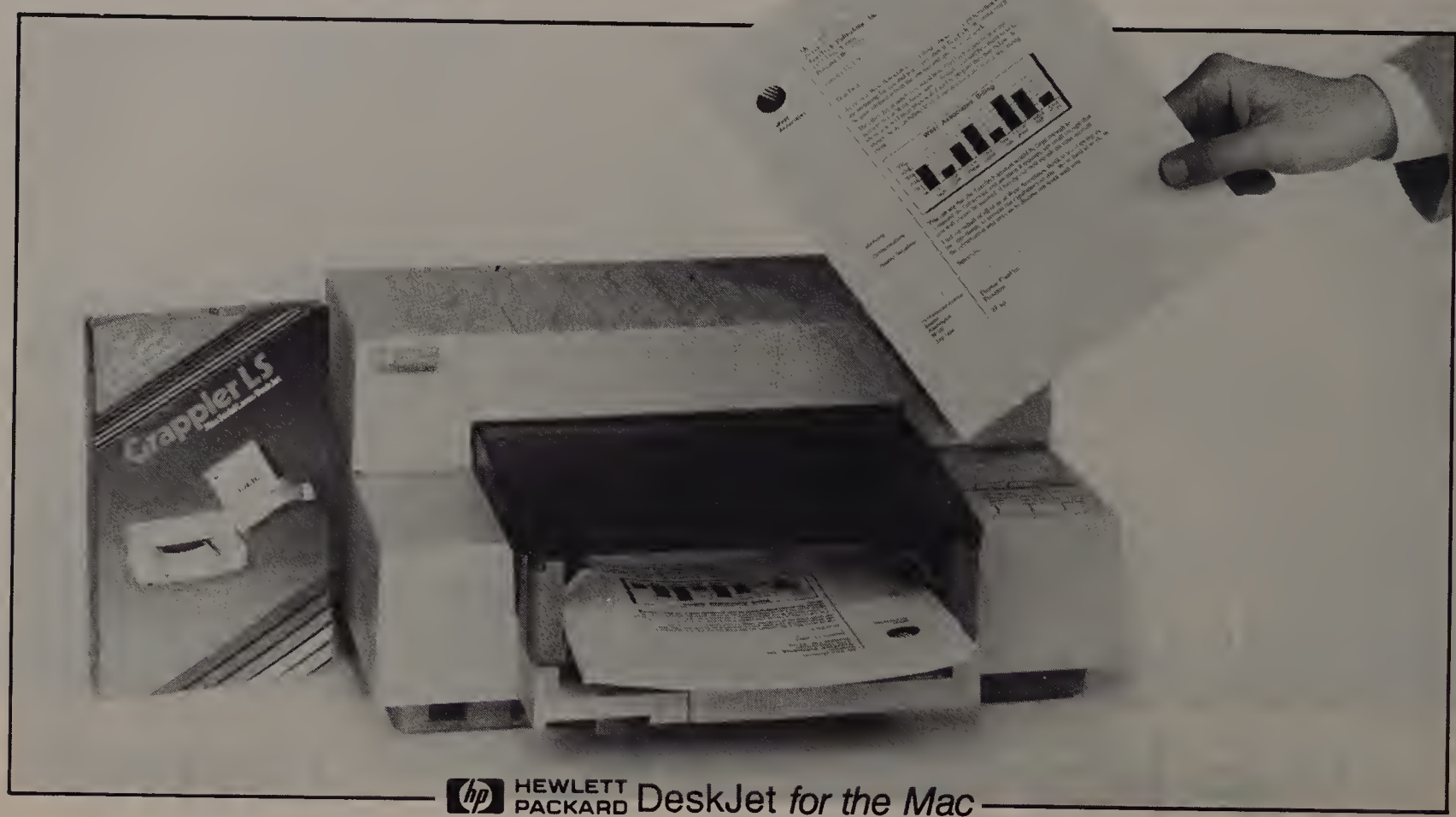

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In the past, Macintosh users had to choose between printers they could afford and output that looked good. Laser quality, previously out of reach, is now available to everyone regardless of his budget. The new DeskJet 300 DPI printer from Hewlett Packard provides the solution.

With a retail price of only $995, the DeskJet offers quality matching that of the Apple LaserWriter IISC, at a cost below that of the ImageWriter LQ. At only 14 lbs., the DeskJet easily follows you to where the work is. Additional features include easy front paper loading, affordable and convenient ink cartridges, and envelope printing. If you need top quality output for the home, school, or small business, the DeskJet delivers.

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Apple's Big Chance

Winning loyalty as well as sales

by Deborah Branscum

"The first disk drive that went just squeaked by under the very short-term warranty. The next drive died a month later and had to be sent to our corporate headquarters, where we have a service contract. The replacement drive failed inside of two weeks."

So goes the scene in "Nightmare from Cupertino," a horror flick starring Bruce Bicknell and a supporting cast of Mac SEs, which took place at a printshop in Albany, New York. After a fourth drive failed, our leading man complained bitterly in a letter to Apple.

"People who come in to use our machines will see a strip of white tape covering the lower drive so they do not inadvertently stick one of their disks in this drive and risk corrupting their data. This is very distressing to me as a consultant who advises people to buy Macs. I hate to have to say to people that the Mac's [floppy] drives have a strong tendency to fail, and the warranty is for only 90 days."

According to an Apple spokesperson, the company answers all of its mail, and even responds personally if a form letter seems inappropriate, but Bicknell never received a reply.

Last June, about seven weeks before Bicknell sent his letter, Apple announced the formation of a Customer Satisfaction Group to "make it easier for customers to do business with Apple." At press time, nearly a year later, the group still lacks a leader and faces the daunting task of placating users made hostile by poor support, high prices, and dealers from hell. It's a big job, but by listening hard to users, Apple could turn around its image as arrogant, uncaring, and insensitive.

As a start, Apple should offer its customers a one-year warranty, just as IBM, Compaq, and Hewlett-Packard do. Of 27 hard disk manufacturers surveyed, only Apple and two other companies limit their warranty to 90 days. One drive vendor, Microtech International, even offers a five-year policy; several others provide two-year warranties.

BCS Update, *edited by Mary McCann, surveys its readers every month. In January, almost half of the survey respondents agreed that computers pose some physical threat to frequent users.*

Canadian customers already enjoy a one-year warranty on any Apple product purchased from an authorized dealer. According to Apple Canada, studies reveal that the Canadian business customer cares most about product reliability, service, and support in making a personal computer purchase. Are U.S. customers really so different?

Apple would gain enormous goodwill—and would probably lose very little—by beefing up its warranty for U.S. customers. Although few users may personally experience a serious hardware malfunction, it's grossly unfair that people who have—like Bruce Bicknell—aren't adequately protected.

Allan Loren, president of Apple USA, tells me that Apple doesn't believe that it needs to change its U.S. warranty, since the longer Canadian warranty involves a different competitive situation. "We have different pricing, different discounts; it's not the same market," he says. Apple will cover products that "fail shortly after warranty," according to Loren. "Unless there's something extraordinary going on, we're pretty lenient about that kind of thing."

(continues)

Loren points out that "the extended warranty program that our resellers sell would be affected by a change of warranty," making it "more complex than what may appear on the surface." It's not clear that everyone would benefit from a change in the warranty, he says, but the point "is well taken and we'll be looking at it with our new set of products."

Apple has been plagued by support problems as well. Early buyers of Apple's CD ROM player, for instance, were told they would receive a free software upgrade last August, which would support the High Sierra format. Four months later users are still waiting for the upgrade, yet Apple denied there was a problem. The Apple CD SC product manager was quoted in the trade press as saying the driver "came out as expected, and right now it's merely a pipeline issue." That's classic doubletalk and was cold comfort to those who needed the upgrade.

Apple should start paying as much attention to established clients as it does to new ones. Reportedly, the manager of End User Computing at a Silicon Valley corporation wasn't contacted by an Apple national account executive for 18 months, despite the company's 800 Macs. The marketing support rep from Apple was nigh invisible as well, apparently the result of having too many accounts to service.

Fortunately, it's nearly spring now, and there are a few flashes of sunlight to warm the hearts of beleaguered users.

Apple is experimenting with a toll-free number in one of its field offices to provide customers with better access to information. Support Navigator, a CD ROM disk with technical information and answers to common questions, has been distributed free to dealers, key customers, and field offices since last fall. (User groups and corporations can probably get a copy if they ask nicely.)

The company is establishing links with consultants and has offered tentative support to groups like the Apple Professional Information Exchange. More important, Loren says Apple's vice president of customer satisfaction will act as an "ombudsperson" to represent Apple customers.

Several corporate users say that Apple officials have been especially attentive recently, in marked contrast to earlier experiences. And Apple's User Group Connection has been an invaluable problem-solving resource for many. "Some of the most cooperative people at the company are in the User Group Connection," says Dave Game, president of the Gold Coast Mac User Group in Miami. "Access to them is almost reason, in and of itself, for joining a user group. Their helpfulness, combined with AppleLink access made available to user groups, provides a real tool for users." That's the kind of support Apple needs to provide—real tools for everyone.

Users Unite

▪ The fourth annual National Apple User Group Conference will be jointly hosted by Apple and Apple Pickers, the Indianapolis user group. NAUGC '89, which will be held from March 31 through April 2, will include seminars on finances, publishing newsletters, and working with dealers (for further information, call Daniel Zoller at 317/291-4042).

Last year's gathering helped launch

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Whatever you do on your Macintosh, you'll do it more productively with a T16.

the Apple Professional Information Exchange, a group with several chapters nationwide (call 408/745-0665 to sign up; Connect users can send a message to APX.) NAUGC is a terrific place to meet serious, involved users. Hope to see you there.

▪ The annual NYMUG Fair will happen April 29. The New York City group's major fund-raiser, this fair attracted some 56 vendors and 1500 attendees last year. A hands-on room allows users to try out a demo disk or two. For more info, leave a message on the NYMUG answering machine at 212/691-0496.

Boston Is Up-to-Date

The Boston Computer Society has revamped its publications by replacing the bimonthly *Computer Update* and monthly *Calendar* with a monthly magazine called *BCS Update* (back issues are available for $4 each).

Each issue includes "Member Forum," which allows users to debate their concerns. Last November's "Member Forum"—by Teresa A. Martin—was "Do Computers Make You Sick?" This interesting article discusses studies of VDT use, includes ergonomic hints, and lists sources for more information.

The BCS takes a strong stand on the issue by sponsoring an annual Wellness Conference and by running a regular column, "To Your Health," which covers the VDT debate, research, and specific case studies that show how particular users are dealing with the issues in practical ways. Call 617/367-8080 to become a member or to get further information.

Service Heroes

"In an era of drop-dead service and expired warranties," Ben J. Zander writes that he was absolutely floored by the effort of Computer Pros of Wayne, New Jersey. "Both Nick [Lucia] and Russell [Couter] spent almost 7½ hours trying to make a sick LaserWriter healthy. More to the point, they came back to my office after hours—at 10 p.m.—and didn't leave until 2:30 in the morning. When the LaserWriter still failed to work, they packed it up, took it with them to the store, and the next day promptly delivered a replacement while they tried to cure an obscure problem."

Greg Rogalski writes that "one rarely hears of a software company that delivers more than it promises," but reports that Spectrum HoloByte is one such vendor. He bought Falcon, an F-16 simulation game, when the option of dogfighting another human via cables or modem was only a promise. He was delighted to receive an update that included the promised enhancements, plus several others at no cost. □

I love happy endings. Send your nominations for sainthood to Service Heroes, Macworld, *501 Second St., San Francisco, CA 94107 or via AppleLink (Macworld1) or Connect (Branscum). Of course, there are plenty of sob stories out there as well, so drop me a line if a company ignores you. I will help solve your problem, if I can. Attention, user groups: let me know what events you sponsor, so we can spread the word.*

report, here's a condensed version.

As with other E-Machines models, the T19 screen image is very sharp and has excellent color quality and gray purity. Image quality is comparable to the T16, and for those who want a larger screen, the T19 is the way to go. E-Machines has once again produced a winner in the color monitor market.

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Try staring into a 19-inch monitor with a 60 hertz refresh rate for an 8-hour day. You'll be watching a constantly throbbing screen, and your eyes will feel like they put in a 24-hour day. Not exactly condusive to getting things done. The T19 has the fastest available refresh rate of 72 Hz. Now that's refreshing.

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Of course we would—but you should decide for yourself if the T16 and T19 are as good as MacUser thinks. Go see one and conduct your own review. For details, write E-Machines at 9305 SW Gemini Drive, Beaverton, OR 97005 or call us direct for your nearest dealer: 1-503-646-6699.

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The Slowing of QuickDraw

How these software routines rule the Macintosh

by Thom Hogan

Last month I discussed in general the areas that most affect the overall speed of a Macintosh. This month we're going to explore one of these areas in detail: the Macintosh video display.

What you need to know about the Mac's video display is best summed up in a single fact: the central processor has to do all the work. That's important, because Apple is pretty much alone in burdening the CPU with display work. Virtually every computer from an Atari ST to a Sun workstation uses some form of dedicated graphics controller to handle the display. Even the IBM PC uses a video chip—albeit a wimpy one that is often ignored by programmers—to control the display. Out in a field by itself, only Apple uses a set of software routines called QuickDraw, all of which are executed by the same 680x0 processor that's doing all the other primary work in the system.

To illustrate the differences in design, and how Apple's design affects overall system performance, let's take a simple drawing task and note how various machines perform them. The task I have in mind is drawing a diagonal line on the display.

To draw a line, all programs must supply a starting point and an ending point for the line. Internally, what happens next on a Sun workstation or similar machine is that those end points are passed to the graphics processor along with the instruction to draw a line. The CPU is now free to do other things while the graphics processor does the actual job of updating the display. Deep down in the video circuitry of these computers, you'll find a set of memory that belongs only to the graphics processor. The graphics processor draws its pixels in that memory, and special display circuitry reads that memory as it sends the actual video signal to the monitor (see Figure 1).

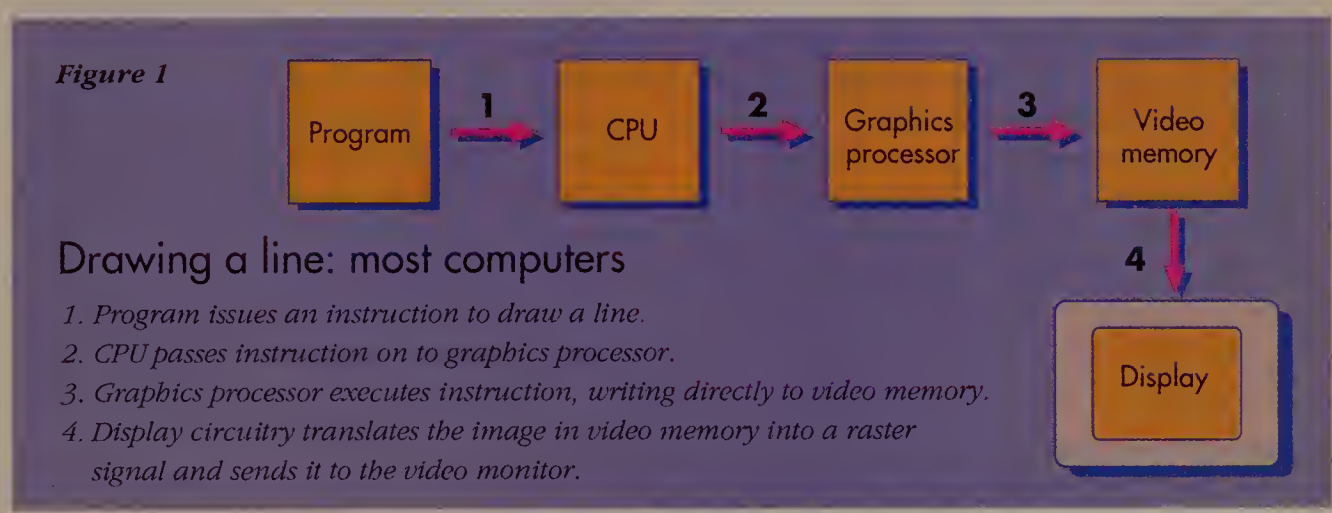


Figure 1

Drawing a line: most computers

1. *Program issues an instruction to draw a line.*
2. *CPU passes instruction on to graphics processor.*
3. *Graphics processor executes instruction, writing directly to video memory.*
4. *Display circuitry translates the image in video memory into a raster signal and sends it to the video monitor.*

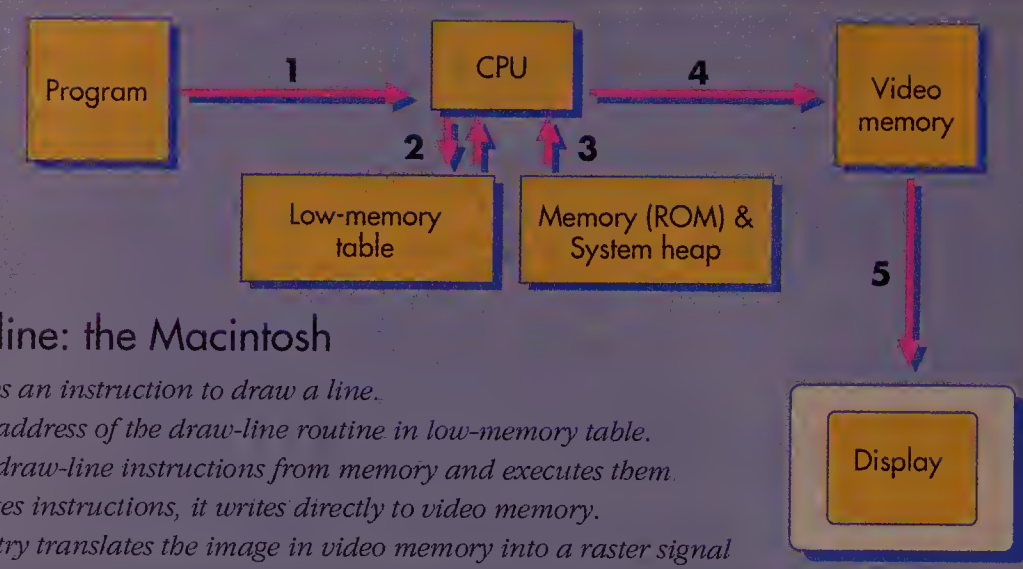
In machines like the Sun, anything you want to display is really sent as an instruction from the CPU to the graphics processor. And these instructions can be quite compact. Instead of sending an instruction that says essentially, "draw a line from *x* to *y*," the processor might send a *tokenized* version. Tokenized means that the instruction has an arbitrary abbreviation, usually a single byte or word. For example, if $0D is the token to draw a line, then the CPU need send only three pieces of data to the graphics processor: *x* position *y* position $0D (that's probably three computer words of data).

Contrast this to the Macintosh design. If you want to draw that same line in the Macintosh, you seemingly do the same thing: you write a program call that specifies the two end points and the QuickDraw action you want taken (draw a line). It's what happens with this information that is different. In the Sun world, the CPU immediately translates the information into the tokenized version that it then sends to the display processor. In the Macintosh world, the call results in the CPU looking up address values in a low-memory table, to see where in memory the routine that draws lines is, and then passing control to that routine (see Figure 2). The CPU then executes that routine (which may be a few bytes long or many bytes long, depending on its sophistication), and no new instruction can be executed until the screen drawing is done. From beginning to end, the Mac's CPU is involved with that line—at no time does it hand off in-

(continues)

Thom Hogan is president of Macreations, a Macintosh software developer and publisher of The Macintosh II Report. *His reference book,* Programmer's Macintosh Sourcebook, *was recently published by Microsoft Press.*

Figure 2



Drawing a line: the Macintosh

1. *Program issues an instruction to draw a line.*
2. *CPU looks up address of the draw-line routine in low-memory table.*
3. *CPU retrieves draw-line instructions from memory and executes them.*
4. *As CPU executes instructions, it writes directly to video memory.*
5. *Display circuitry translates the image in video memory into a raster signal and sends it to the video monitor.*

formation to another component to do the work.

Think about that line we're drawing. To draw a diagonal line, each point between the start position and the end position must be calculated. You may remember from high school geometry that lines are supposed to be infinitely small in width (that is, they have no real width). But the pixels on the display certainly have a fixed size. So, as the CPU draws the line, it is calculating which pixel on the screen is closest to the line that would be drawn if an infinitely narrow line could be drawn between those two points (see Figure 3). As you might guess, that can be a fair amount of calculating, and if the CPU has to do it all, it can't be doing other things.

But wait a minute, you say. What about the graphics processor in those other machines? Doesn't it have to do the same calculations? Sure, but it does them on its own, without tying up the CPU. And since the graphics processor has been optimized for performing drawing functions, it can usually do them faster than the CPU can.

So the Mac's CPU does a lot of calculating. How much penalty do we pay for that? Well, that's a tough question to answer precisely. To draw a single black pixel on a white display is trivial for the 680x0. One nice thing about the 680x0 CPU lineup is that it has excellent bit-handling abilities. And, at least in black and white, a single pixel is represented by a single bit of memory. So, if your programs are full of draw-a-pixel-at-*x* instructions, you won't see much speed improvement over the Mac's CPU from a graphics processor.

Another thing that the Mac does well is move blocks of black-and-white pixels around on the screen. (A QuickDraw instruction called CopyBits is usually used for this operation, and it's efficient.) So, once those lines are drawn on the display, the Mac can often move them around with little or no sacrifice in speed.

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But Macintosh software generally doesn't create displays pixel by pixel. Instead, we programmers call QuickDraw routines to draw lines, boxes, ellipses, and strings of text. And once we've got those items displayed, we often want to do more than just move them around the display with CopyBits. Indeed, much of QuickDraw's lure for programmers is its sophisticated region-handling abilities. A QuickDraw region can be just about any group of connected pixels, regardless of shape or size. It's sort of like the lasso tool in MacPaint—the area you select with the lasso is a region. There are QuickDraw commands to move regions, invert regions, hide regions, copy regions, and do all sorts of other interesting manipulations with them.

From a programmer's point of view, that's great. Instead of fooling around with pixels and bits, your program can deal directly with larger concepts, like lines, rectangles, polygons, and regions. From a performance standpoint, however, it can often be the pits. No matter how great a genius you think Bill Atkinson, the principal designer of QuickDraw, is, you can't expect miracles.

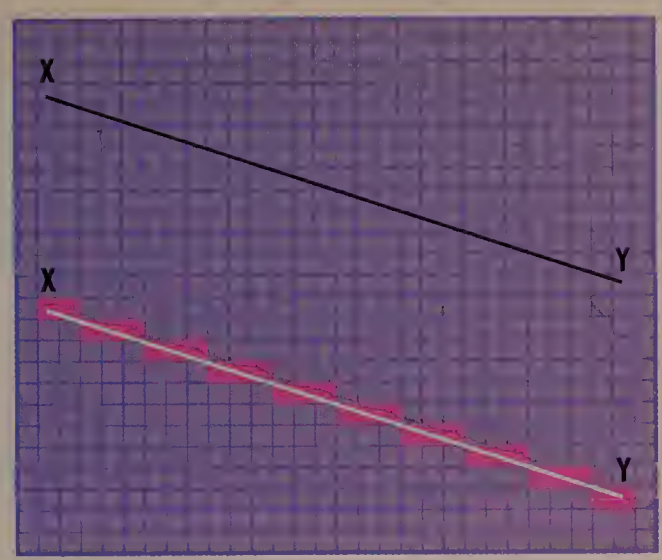

Figure 3

The top line is a theoretical line drawn from point x *to point* y. *The dotted boxes represent the underlying pixels on the display. The bottom line has been drawn using the pixels that come closest to matching the line's actual path (in white).*

Bill did an excellent job of creating fast, efficient screen-drawing routines. But they all have to be executed by the CPU, and as I mentioned earlier, no new instruction can be executed until the screen drawing is done. This is one of the reasons behind last month's conclusion: speeding up the CPU is probably the most effective way of speeding up a Macintosh.

The addition of color in the Mac II made things worse in the QuickDraw realm. In a standard Plus or SE, QuickDraw is dealing with 342 by 512 bits, or a total of 175,104 pixels. In a monochrome Mac II display, that number has been upped to 307,200 pixels (640 by 480). That's almost double the number of pixels the CPU has to deal with. But the 256-color mode of the Mac II makes that total 2,457,600 (640 by 480 by 8) pixels. That's 14 times the number of pixels in a standard Mac.

Even if the CPU does nothing but write white pixels on the entire screen, we're starting to see significant performance degradation as we get into the advanced color modes. Consider this: the 33MHz 68030 handles about 4 million instructions per second. To manipulate our display memory directly, we need to set 307,200 pixels. At 24 bits per pixel, that's a little over 7 million bits of information. The best-case situation results in a write time of about .17

(continues)

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seconds. Can you see .17 seconds? You sure can; it's about three times longer than the persistence of vision limit that our eye/brain combination translates into continuous motion. And that's just to write the entire set of pixels to a single color on a Macintosh that's faster than any that you or I could buy from Apple. In other words, we're talking about optimum here. I've seen 24-bit displays that take as long as a second to update the screen.

The real world is much more complex than the example above, of course. Coupled with that is the fact that color bitmaps to date have not been contiguous sets of bits. (We're getting to the chunky, planar, and chunky-planar stuff you may have heard about.) A monochrome bitmap in the Macintosh is designed as a set of adjacent pixels (bits) in memory (see Figure 4). The second pixel on the top row is the second bit in memory, the third pixel is the third bit, and so on. The 256-color mode that QuickDraw currently uses is chunky. This means that each pixel is stored as a "chunk" of memory in the bitmap. When you turn the monitor colors to 256, you are using

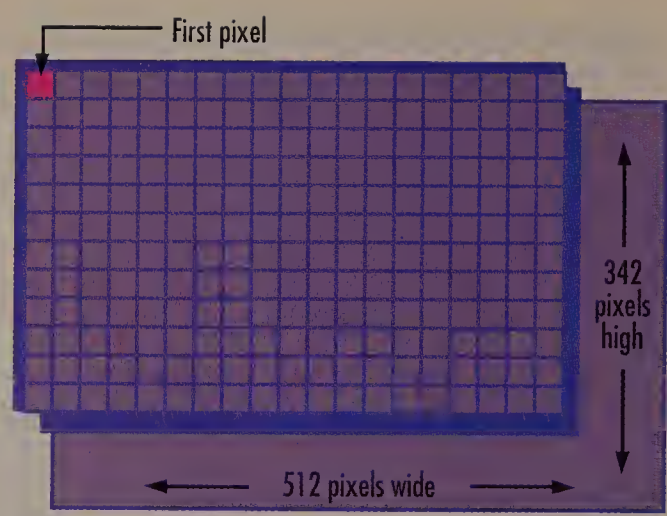

Figure 4

Monochrome Bitmap: Note that each row of pixels is 64 bytes in size (512 pixels by 1 bit per pixel ÷ 8 bits per byte).

8-bit color, so each pixel is stored as 8 consecutive bits, which contain a code representing color (see Figure 5). That code is actually an index into a color table, which holds the true RGB information the system needs to know to draw the actual color. Thus, the CPU can't simply grab one thing to get information about a single pixel—it must grab eight things. Worse still, the eight things it grabs aren't actually the pixel's color. Instead, that value is a coded entry into the current table of colors (the palette). That CPU is starting to do a lot of extra work, isn't it?

The 24-bit color world gets even more fascinating. One definition of extended color (used by the original RasterOps 24-bit color boards) uses a modification of the 8-bit color mode. Instead of one plane of 8-bit pixels, there are three. Each pixel is now represented by three 8-bit values. The three planes represent the red, green, and blue components of the pixel. And the 8-bit pixel value in each plane is again an index into a palette, this time individual indexes for red, green, or blue. But still, the CPU has to go to many places to read the information about a single pixel. Recently Apple released information to developers about the rewrite of color QuickDraw that will appear in the next version of system software. Developers have received three full releases of the software and Apple will probably issue one more. TrueVision, RasterOps, and SuperMac are all shipping boards using the new 32-bit color model. Everyone I've talked to about the 32-bit color model says the

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final release is right around the corner, but they also indicate that update speeds, while somewhat better than those of the current 24-bit products, are still not anywhere near equivalent to the monochrome or 8-bit color speeds.)

So far, each new iteration of Apple's display mechanism has required more and more effort on the part of the CPU. That trend has got to stop, or else not too far in the future we'll need a 68GHz 68090 chip to power our Macs. Well, some hope can be found, even if it may still be a while before we get an actual product. Apple, SuperMac, and Radius have prototypes of QuickDraw processors—add-in boards that offload some (but not all) of the QuickDraw chores from the CPU. Radius's board has the advantage of being designed by several of the original Mac wizards, including Andy Hertzfeld. Unfortunately, Radius has put this project on the back burner in favor of other products, so we may have a long wait for the first QuickDraw processor.

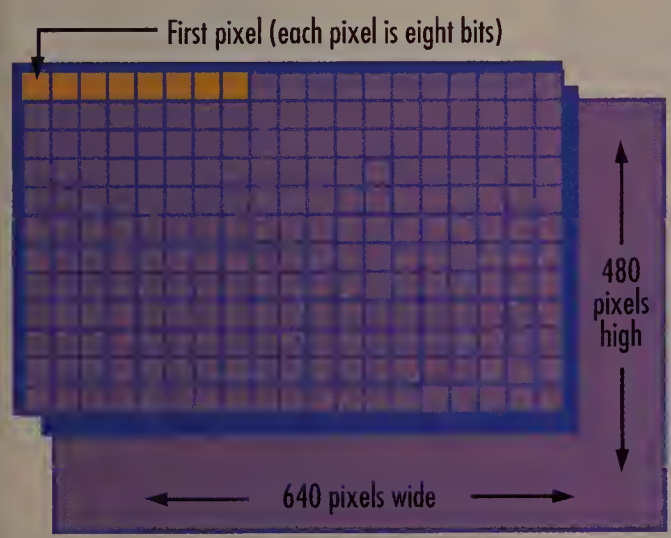

Figure 5
Color Bitmap: Note that each row of pixels is now 640 bytes (640 pixels by 8 bits per pixel ÷ 8 bits per byte).

Such boards have their problems, too. Initial tests seem to indicate that their real-world performance isn't as dramatic an improvement as you might expect—maybe 50 percent faster screen writes, on average. That's partly a testament to how efficient the original QuickDraw routines are, and partly a fault of the Mac's hardware design, which doesn't lend itself well to concurrent processing. Another approach is being taken by RasterOps, which has a prototype of a set of software that the company calls Faster Raster. This software translates QuickDraw information and instructions into instructions the TI graphics processor on the RasterOps video board can understand. There's a limiting factor to this approach: TI and Apple treat memory images and regions quite differently, and thus you again end up with the CPU doing significant work translating back and forth. Nevertheless, the idea holds promise, and the RasterOps video board certainly does update the screen visibly faster with the new software. Expect to see this product shortly after Apple officially releases the new 32-bit color standard to the public.

I still expect to see one or more speed-up boards introduced this year, however, and their abilities should improve dramatically as the Macintosh continues to open up to developers. (We could use a faster NuBus, and better I/O support, for example; I expect we'll get it.) How much improvement we can expect is unclear, but I believe we'll eventually have color displays that are as fast as the current monochrome ones. That will be quite an improvement, especially for someone like me, who leaves on the 256-color mode all the time. □

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MiniCad+ ..... **520.**

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ComputerEyes ..... **209.**

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FASTAT ..... **165.**

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MapMaker ..... **215.**

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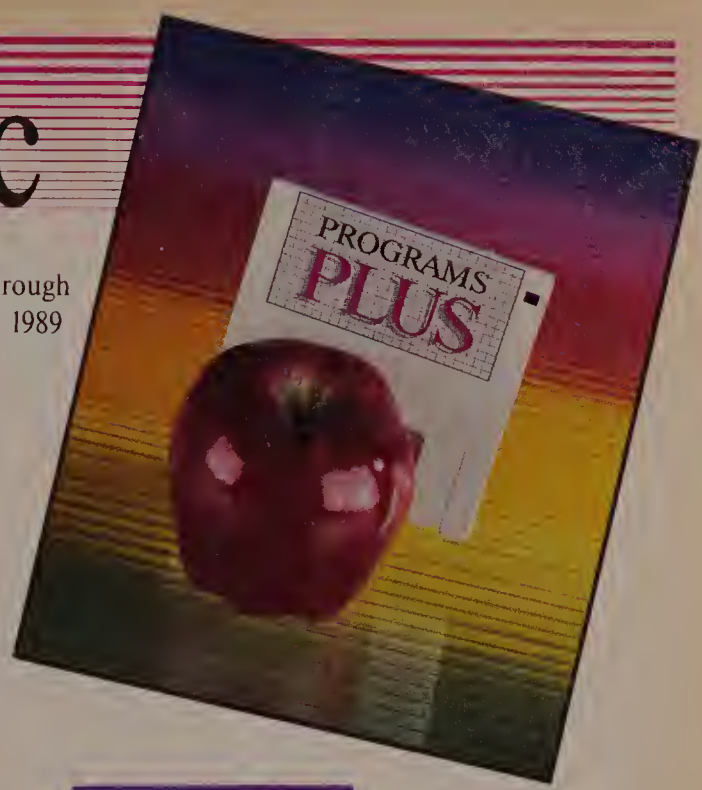
MAC-101 Keyboard by DataDesk

If you are looking to replace your Mac's keyboard, the ***MAC-101*** by DataDesk is the way to go. It comes in an ADB version for the Mac SE and II, and a non-ADB version for the Mac 512 and MacPlus. The positive tactile, firm feel 101 includes a full numeric keypad, 15 function keys, 6 page control keys, and a T-style cursor pad. Keyboard status indicator lights let you know when everything is going smoothly. Includes *101-Keys* desk accessory software, a powerful macro utility which allows you to exploit the full power of the function keys with almost any Macintosh application.

MAC-101 Keyboard *(Specify ADB or non-ADB)* ..... **145.**

to Polish Up Your Mac



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April 30, 1989

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"The PhoneNET System Connector uses ordinary phone wire to create an AppleTalk network. I got one for every computer."

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"TrafficWatch tells me who's talking to whom and how much, and what kinds of errors are occurring on the network. 'Add it to the pile', I said."

"Timbuktu/Remote lets me share screens, just like with Timbuktu, over modems or ISDN links."

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Macworld News

by Tom Moran

Beyond HyperCard

As the popularity of HyperCard grows among developers, several companies are offering supersets of the HyperCard environment or add-ons for it. Most exciting are two HyperCard supersets slated for release in the second quarter of 1989. Silicon Beach Software's SuperCard and Plus from Format Software of Germany both will run existing scripts with little or no modification, and will provide most of the features (such as color support, variable card sizes, object-oriented drawing tools, and an enhanced programming language) that we've been waiting for since HyperCard made its debut. Let's hope that those who program for HyperCard won't have to take a back seat to their Pascal and C counterparts any longer.

While not a superset of HyperCard, Tabularium from All-American Software is a new HyperCard application that makes it easy to quickly move tab-delimited text files into and out of stacks. Although it's not hard to write a script to do the job yourself, the company claims that importing and exporting data is at least 75 percent faster with Tabularium.

Another new add-on product gives HyperCard the ability to work with array variables, a feature near the top of every HyperTalk programmer's wish list. CLR HyperArrays from Clear Lake Research provides 24 XCMDs and XFCNs that let you manipulate numeric arrays, sort fields, and test variables to see if they're numeric.

For further information, contact All-American Software Development Corporation in Minneapolis, Minnesota, at 612/537-8910; Clear Lake Research in Houston, Texas, at 713/523-7842; Silicon Beach Software in San Diego, California, at 619/695-6956; or Format Software GmbH in Cologne, West Germany, at 49/221/4972075.–*Franklin Tessler, M.D.*

MAX AGUILERA-HELLWEG

Charlie Jackson (left) and Bill Appleton (right) developed Silicon Beach's SuperCard, a HyperCard superset with new features such as color support, variable card sizes, object-oriented drawing tools, and an enhanced programming language. Format Software offers a similar superset, entitled Plus. Both programs run existing scripts with little or no modification.

Striving for Success

Project Strive, a New York City job-training/job-placement center situated near Harlem, teaches more than word processing, data entry, and desktop publishing. A student also learns interview skills, time management, responsibility, how to meet deadlines, and how to work with coworkers and supervisors.

Most of Project Strive's students are on public assistance. Many are school dropouts, single parents without childcare, or people who have been abused by parents or spouses. Students have no prior computer experience.

Project Strive's intensive three-week workshop is a major test of a student's attitude. Working on Lisa, Mac 512K, and Mac 512KE computers, students use a variety of Mac programs to develop skills in real-world projects. For example, each student uses MacPaint to design a flyer. Students also use MacWrite, Cricket Graph, PageMaker, and ReadySetGo.

Alternating with the computer class is an attitudes/interview skills class that teaches self-confidence and

(continues)

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STEVE HILL

Frank Horton teaches at Project Strive, an East Harlem employment service that uses Macs to train people in computer skills.

self-esteem and lets students practice job interviews. A videotape class works on personal interaction and helps students understand teamwork and organization.

Once a student completes the workshop, Project Strive's job placement service steps in to place the student in a job that fits his or her interests. There's no counseling; it's strictly up to the students to decide what they want to do and to stay with it. Graduates are now working in responsible positions at companies such as Merrill Lynch, New York Telephone, and Smith Barney.

Each year 10 to 15 workshops are held at the Harlem location. Over 526 people have graduated, giving the program a remarkable 78 percent success rate. Some graduates have returned to school and even gone on to college.

A nonprofit organization, Project Strive is subsidized completely by private donations from companies such as IBM, Xerox, the New York Times, Chase Manhattan, First Boston, and Bankers Trust. Project Strive does not accept government funding, and prefers to buy its own computers and software. Recently it opened up two new centers, one in the Bronx and another in Pittsburgh.

For more information, contact Project Strive, East Harlem Employment Service, Inc., 173 E. 112th St., New York, NY 10029, 212/369-5500. *–Brita Meng*

And Now Presenting . . .

Two leading Macintosh presentation packages came out with major upgrades in December. Both include new drivers that let you link the Mac directly with slide services.

Microsoft's update, PowerPoint version 2.01, includes a Genigraphics driver and GraphicsLink software. Among other features, the software offers over 5000 Genigraphics-designed color schemes and the Genigraphics color palette; even users running PowerPoint in black and white on a Mac Plus or SE can use the palette to specify colors and thus create color slides. Using GraphicsLink, you send completed Power Point presentations via modem to Genigraphics by noon one day, and before noon the following day you receive by courier the finished 35mm slides or transparencies. PowerPoint 2.01 retails for $395; the Genigraphics driver and GraphicsLink are free to all registered users of PowerPoint 2.0.

Symantec is shipping More II, a complete revision of the popular outliner More that has advanced word processing features such as wrapping headlines, headers and footers, page breaks, automatic labeling, and Microlytic's 100,000-word SpellFinder spelling checker. The outline processor provides new sorting and organizing capabilities that let you manage information with great flexibility; it also includes style sheets called *Rules,* which format WYSIWYG charts and outlines instantly.

For presentations, you can combine More II–created outlines with files imported from a wide variety of other programs including ThinkTank, MacPaint, Adobe Illustrator, and Microsoft Word, and then add visual effects like wipes and dissolves. You can give on-screen presentations using two Mac IIs, with one computer serving as a status center for the speaker, showing the speaker's notes and a bar chart that times the presentation. The other Mac shows the presentation to the audience. More II includes a driver for sending presentations automatically by modem to MagiCorp, a service that produces slides or transparencies and sends them back by overnight courier. List price for More II is $395; registered More users can upgrade for $89.

For further information on More II, call Symantec Corporation in Cupertino, California, at 415/964-6300; for information on PowerPoint, call Microsoft, in Redmond, Washington, at 206/882-8080. *–Felicity O'Meara*

Microsoft's updated PowerPoint 2.01 includes a new driver that lets you link the Mac with a slide service via modem.

Hot Wires

Northern Telecom now has an $895 modem available that will allow data to be transmitted from a Macintosh to a PC at 19,200 bits per second. The University of New Brunswick in Canada is testing it with Timbuktu Remote communications software from Farallon, as well as with Liaison AppleTalk bridging software from InfoSphere. According to John Webster, director of audiovisual services at the university, however, the

(continues)

Built to scale

If you design on a Mac II, a screen that's too small will cramp your style. That's why you should be looking into a SilverView from Sigma Designs.

At 21", this landscape monitor offers the biggest viewing area anywhere. A full 16" x 12" 2-page spread including rulers and margins.

Which means you can finally work in actual size. A fact that's also made possible by SilverView's 72 dots per inch type setting standard.

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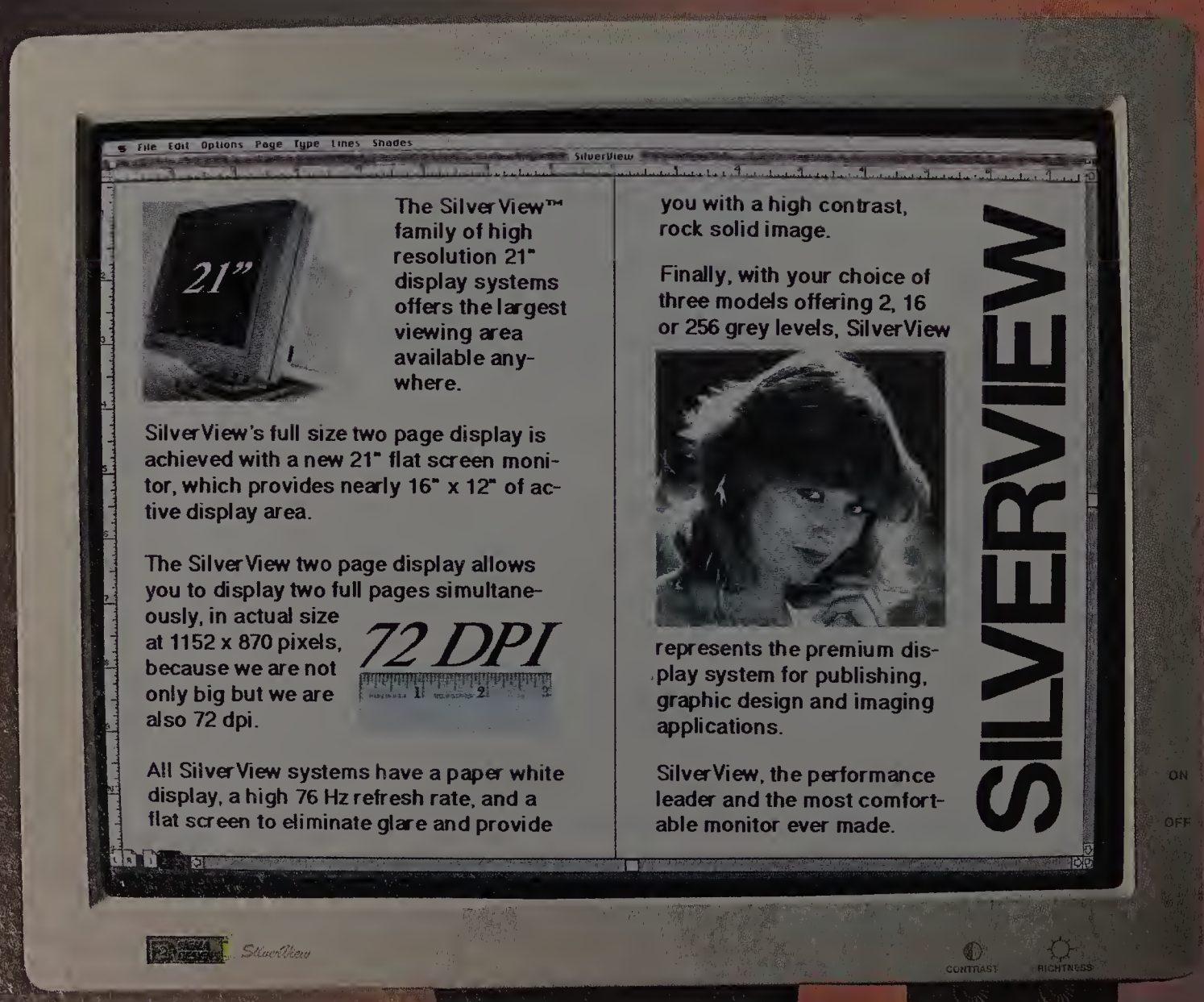

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BRIAN SMALE

Northern Telecom's $895 modem transmits data from a Mac to a PC at 19,200 bits per second.

modem can't be used with Red Ryder communications software. Although 19,200 bps does appear as an option in Red Ryder's configuration menu, it isn't supported, he said. (A 19,200-bps bidirectional data link, which utilizes a voice-data multiplexer, is reportedly part of the Central Office LAN service available from certain Bell operating companies. However, the service apparently isn't offered in all areas.)

For more information call Northern Telecom in Richardson, Texas, at 214/437-8000. *–Sharon Fisher*

A Calculator for the Page Designer

The marriage of traditional and desktop publishing methods is not without conflict, confusion —and lots of calculation. To ease some of the problems, a graphic designer for *American Demographics*, a 95 percent desktop-published magazine, has developed a HyperTalk-based program for calculating enlargements and reductions of photographs and illustrations. Designer John Parsons wrote GraphiCalc so that he could translate traditional printer's picas into PostScript picas online.

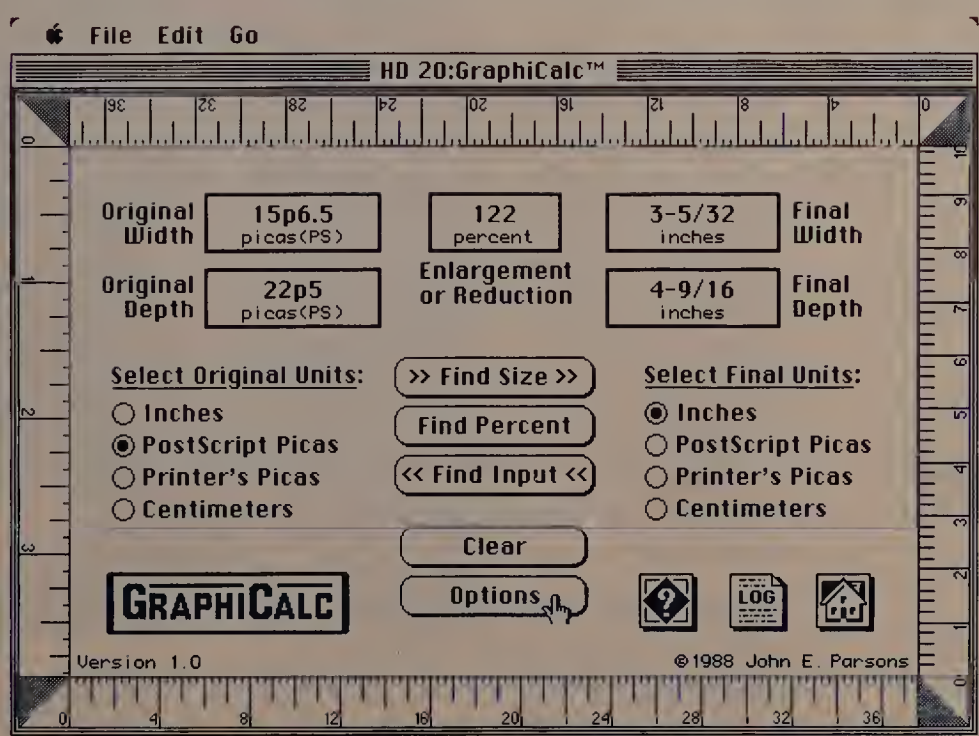
Before writing GraphiCalc, Parsons struggled through the following steps: (1) measuring photos and illustrations in printer's picas; (2) converting printer's picas to decimals of inches; (3) switching the PostScript pica default on his page layout program to inches; (4) entering the decimals of inches; (5) switching back to the PostScript default on his page layout program; (6) entering the percentage enlargement or reduction desired.

GraphiCalc has enabled Parsons to convert from original measurements to final reductions or enlargements—using only one HyperCard screen. He estimates that he can now do ten such conversions in the time he formerly spent doing one. GraphiCalc also lets him enter original and final measurements first, and then calculate the percentage of enlargement or reduction required.

A third GraphiCalc calculation compensates for the size distortion that often occurs with plain-paper laser printers. If your printer is not perfectly accurate, you can print a document, measure its inaccuracy, and then type the name of the printer and the inaccuracy measurement into your GraphiCalc stack. From then on, you can select Find Input, and the program will compensate to produce WYSIWYG output.

GraphiCalc will also create a file that logs all of your calculations, so you won't have to constantly move back and forth between computer and paper. Then you can save the file and print it out later when it's time to jot down the new measurements on the back of your photos or illustrations.

GraphiCalc requires HyperCard and will run on any Mac with 1MB of RAM, but running it in tandem with another application requires at least 2MB. (Parsons has 5MB and uses GraphiCalc with PageMaker and Adobe Illustrator running all at once under MultiFinder.) For further information, contact ProGraphics, P. O. Box 6856, Ithaca, New York; 607/277-0916. *–Ann Garrison*



GraphiCalc, a HyperTalk-based program, helps page designers calculate enlargements and reductions of photos and illustrations.

E-Mail Support Grows on Vines

Banyan Systems recently announced a Mac electronic-mail gateway that links its own VINES Network Mail with CE Software's QuickMail. Now users of IBM PCs and compatibles can send E-mail and file attachments to Macs over the VINES network.

The VINES Mac Mail Gateway program has two components: the listener, which runs as a VINES service on a Banyan server; and the bridge, which runs with the QuickMail Administrator program on a Mac. Users of VINES Network Mail or QuickMail do not need to know the location of the gateway or of the receiving system; the gateway uses VINES's network-wide naming and addressing scheme to deliver mail transparently.

The bridge and listener software communicate using AppleTalk protocols, which are supported in version 3.10 of VINES Network Mail. Macintoshes must be connected to the VINES server via Ethernet either directly (with an add-in board such as Apple's EtherTalk) or through an Ethernet-to-LocalTalk bridge (such as Kinetics' FastPath).

VINES, a network operating system based on UNIX System V, integrates dissimilar local area networks, wide-area networks, and minicomputers and mainframe computers. Earlier versions of VINES-supported networks include IBM's Token-Ring, 3Com's EtherLink, Ungermann-Bass's Net/One, and public data networks that run the X.25 protocol. Now that AppleTalk networks are supported in VINES, Macs can also be in-

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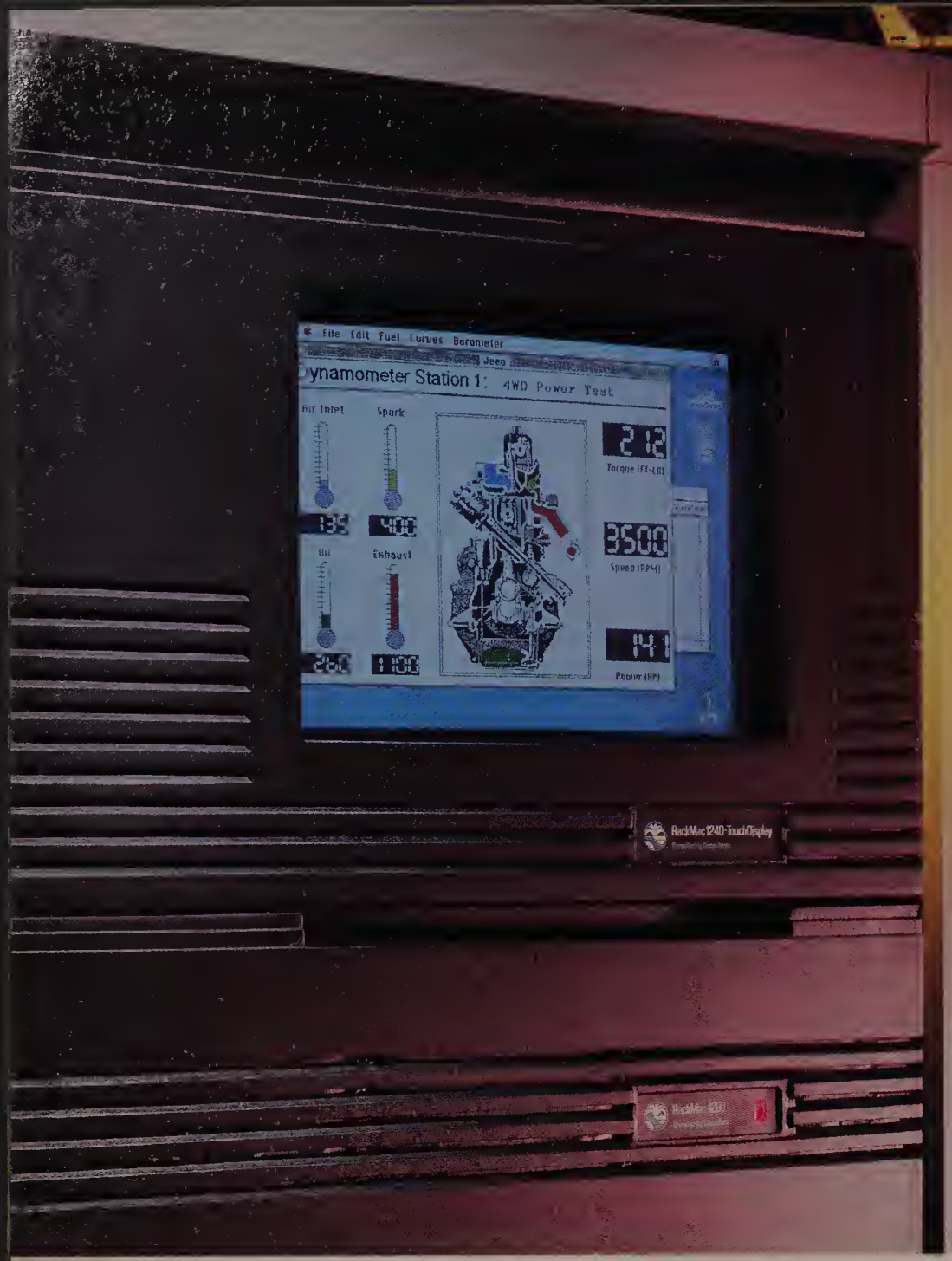

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cluded. In addition, Macs can take advantage of other VINES mail gateways—for example SoftSwitch's PROFS mail gateway to IBM mainframes.

Jointly developed with StarNine Technologies of Berkeley, California, the VINES Mac Mail Gateway is actually a port of StarNine's Mail Link Gateway, which bridges Mac mail programs and UNIX Mail. Banyan selected QuickMail as the Mac front end because it was the only available mail package that supported mail gateways. Banyan plans to ship the gateway in April for $795 per server.

VINES's support of AppleTalk protocols will make it easier to further integrate the Mac into the VINES network while maintaining the Mac interface. Future services will include file and printer sharing, and mainframe/minicomputer gateways.

For more information, contact Banyan Systems, in Westboro, Massachusetts, at 508/898-1000.—*Brita Meng*

ABC's Interactive News

Last year's presidential election may lead to a revolutionary use of laser disk technology. During the campaign ABC's Peter Jennings used an 18MB HyperCard application consisting of nearly 200 stacks with thousands of detailed cards on candidates, voting records, issues, and so on. The application, called *Magna System: The '88 Vote,* won *Macworld*'s 1988 SuperStacks contest and made ABC so happy that the network has created a team to develop interactive video with HyperCard and archival ABC news film footage on laser disks.

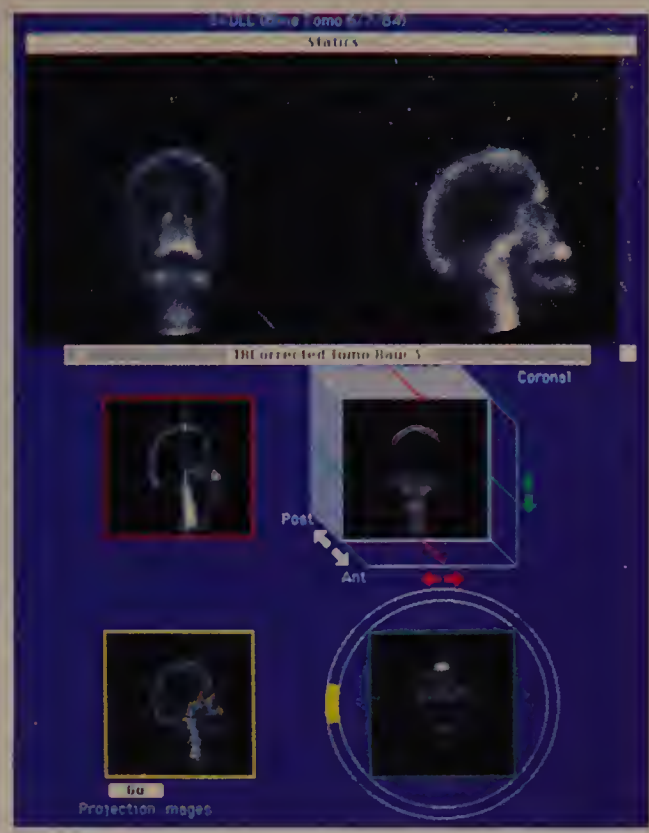
ABC's first product in its planned *Instant Replay of History* series is a modification of the application Jennings used. Called *The '88 Vote: Campaign for the White House,* the new application allows you to access not only thousands of cards but also 108,000 frames of election news footage. Want to review the honor or infamy bestowed upon a "card-carrying member of the ACLU"? The assaults and counterassaults over who did the damage to Boston harbor? Click on a few buttons and presto—a year's worth of news footage is at your command. You can also click for commentary by ABC's political analyst Hal Burns, for an ABC news overview of an issue, or for the candidates' commercials. One 30-minute side of the laser disk contains footage leading up to and through the conventions, the other follows George Bush and Michael Dukakis through the final stretch.

The network's interactive video team is still so new that it hasn't yet settled on its next subject, but with all the historic film footage archived at ABC, there are plenty of options. In most cases, the primary markets will be educational. "The teacher or the student can become the anchorman," says the program's creator, ABC producer David Bohrman. They will be able to use the programs to create their own documentaries or satires—so long as they don't credit them to ABC.

The ABC product requires a Mac Plus or higher system with 1MB of hard disk space, a laser disk player with a serial interface, and any standard television monitor. *The '88 Vote: Campaign for the White House* will cost under $400 including the laser disk, the HyperCard stack, and a guidebook to its contents. For further information, contact the product distributor, Optical Data Corporation, in Florham Park, New Jersey, at 800/524-2481.—*Ann Garrison*

JONATHAN LEVINE

ABC's David Bohrman shows off a laser disk of '88 election news footage, which can be accessed with a HyperCard stack.



Cranial bone scan displayed by Report and Image Management System (RIMS), a Mac II–based system for nuclear medicine image-viewing and reporting developed by Medical Image Processing Specialists (MIPS).

A Better Image

The Macintosh is continuing to make inroads into medical imaging. At last November's meeting of the Radiological Society of North America, health professionals saw a wide spectrum of Mac-based applications, ranging from image analysis to education. One reason

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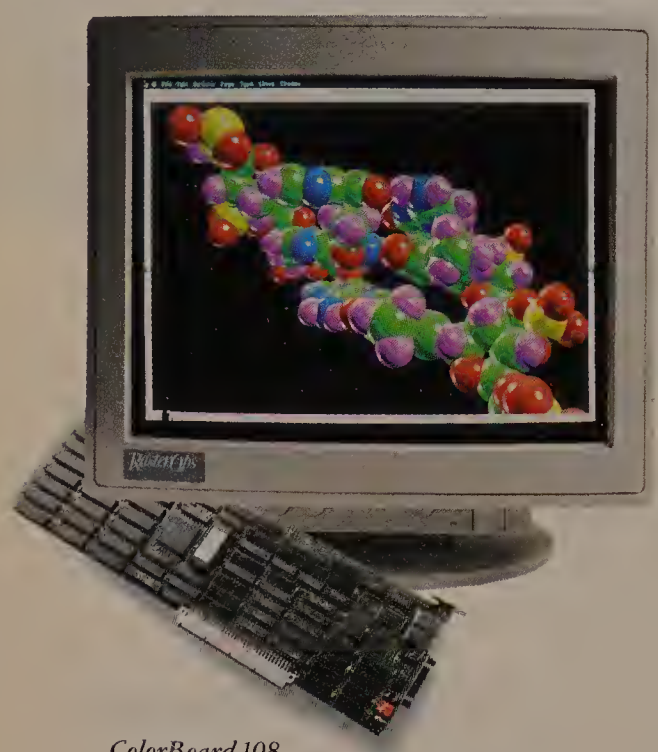

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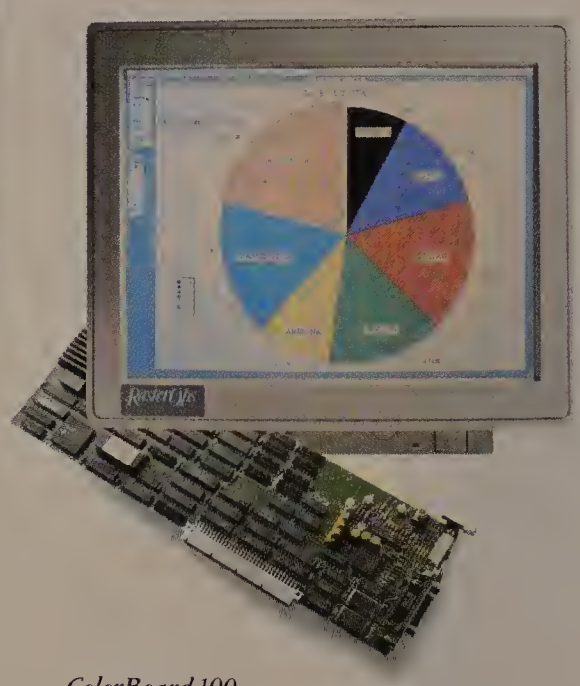

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The Ehman 20 MB Hard Drive is vivid proof that you don't always get what you pay for...*sometimes you get more.* At just $399 the Ehman drive is significantly less than the leading 20 MB drives on the market. But please don't judge us by our price.

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Peripherals Designed for Value

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Circle 452 on reader service card

for the Mac's growing popularity is cost: even after last year's price hikes, Mac II workstations are a bargain compared to similar systems costing ten or twenty times as much.

During the presentations of Macintosh imaging applications, Automatix showed software that provides sophisticated edge detection and image enhancement. Medical Image Processing Specialists (MIPS) demonstrated a Macintosh II–based system for nuclear medicine image-viewing and reporting.

For further information, contact Automatix in Billerica, Massachusetts, at 508/667-7900 or MIPS in Ann Arbor, Michigan, at 313/665-5400. For more information on the Macintosh presentations, call me at UCLA, at 213/825-8813.–*Franklin Tessler, M.D.*

New BackPac Plus Modem

Jasmine's new version of BackPac is a small miracle of compactness. The hard disk clamps right onto the back of the Mac and fits into standard Mac carrying cases. It saves not only space but also the SCSI port; you plug a cable into the power outlet and into the drive, plug the drive into the power socket on the back of the Mac, and leave the SCSI port free for other peripherals. The BackPac becomes the back of the Mac and its on/off switch replaces the one on the Mac.

All this space-saving cuteness was there in the first BackPac, but the new version can also support an internal modem to save even more space. You just fit Jasmine's 2400 TalkBac modem right into the BackPac and let it draw power from

ROBERT HOLMGREN

Jasmine's new BackPac hard disk fits right onto the back of the Mac Plus or SE.

inside. If you purchase a base with the modem, you can also remove it from the drive and use it as a stand-alone unit.

The old BackPac was a 40MB drive for the Plus only; the new one works with either the Plus or the SE and comes with 20MB, 45MB, 70MB, or 100MB of storage. If ordered directly from Jasmine, the BackPac costs $629 for 20MB, $879 for 45MB, $1079 for 70MB, and $1479 for 100MB. The TalkBac modem costs $199 alone, $269 with the base for stand-alone use. For further information, contact Jasmine Technologies, in San Francisco, California, at 415/282-1111 or 800/347-3228.
–*Ann Garrison*

GunShy in Color

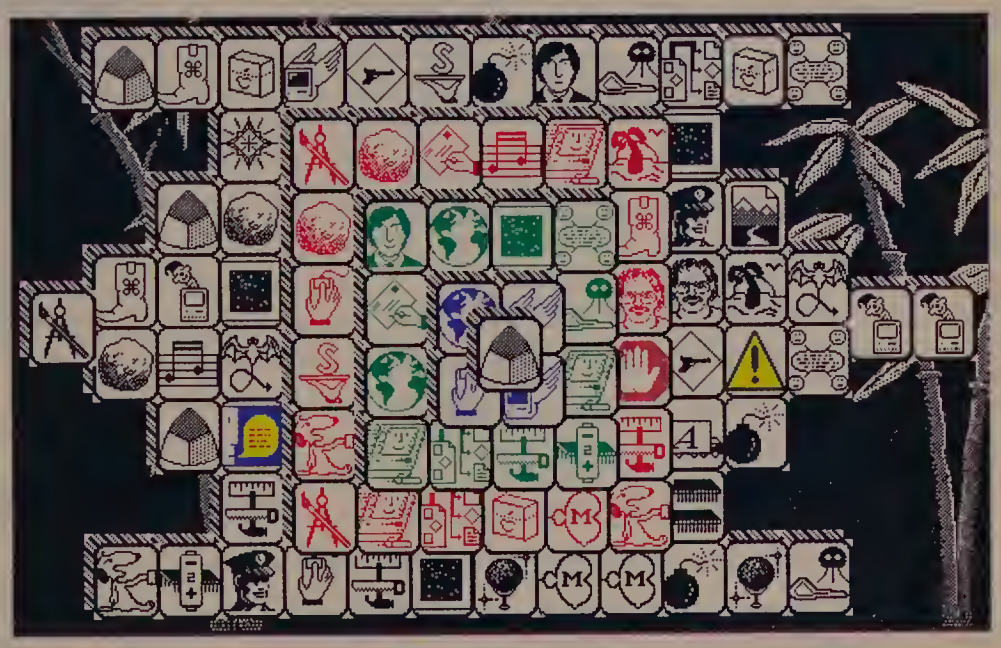
The Gold Coast Macintosh Users Group is distributing Hot Disk 36, which includes a color version of GunShy, the shareware solitaire tile game.

GunShy is very similar to Shanghai, another game in which you attempt to match pairs of tiles and remove them from a five-layer pyramid of tiles.

GunShy's tiles, however, are decorated with familiar icons from the Mac, popular applications, and games such as Crystal Quest. The icons seem easier to recognize and match than Shanghai's mah-jongg tiles. The color version of GunShy has only a few color icons, such as the hand on the red stop sign and the yellow triangle with the exclamation point. Color is also used to highlight the tiles according to which layer of the pyramid they're on.

Hot Disk 36 also offers a Go-playing program, a darts game, and a demo of MacCD—a CD ROM "audio studio" and library of sounds. The demo, featuring sounds from "Star Trek," lets you replay audio highlights from the show—including the sound of the high-tech doors opening. Clearly, the demo sounds were chosen for installation as system cues—for instance, you hear the doors opening when you start up; Mr. Spock says "I cannot obey your order, Captain" when you make an incorrect command; and he says "Live long and prosper" when you shut down.

The disk also offers Anti-Virus 1.03E, billed as removing nVir and immunizing against it; a HyperCard utility for creating text fields that scroll with one keystroke; and Anonymity, which enables you to change the registered user name on certain applications. Hot Disk 36 costs $7 for members and $10 for nonmembers. For more information, call the Gold Coast Macintosh Users Group in Miami, at 305/447-7888.



Hot Disk 36, from the Gold Coast Macintosh Users Group, features GunShy, a game played with tiles decorated with Mac icons.

C++ and MacApp 2.0

Responding to a strong interest voiced by developers, Apple has implemented C++ for the Macintosh. A beta version of the object-oriented programming language designed by AT&T is now available through Apple Programmer's and Developer's Association (APDA). A final version will be available after AT&T finishes defining the language, probably later this year. Apple plans to create a set of interfaces between MacApp and C++ to allow existing MacApp objects to be used as a basis for further development in C++.

MacApp 2.0, a new version of Apple's object-oriented Pascal programming library, has sev-

(continues)

Tools of the Trade

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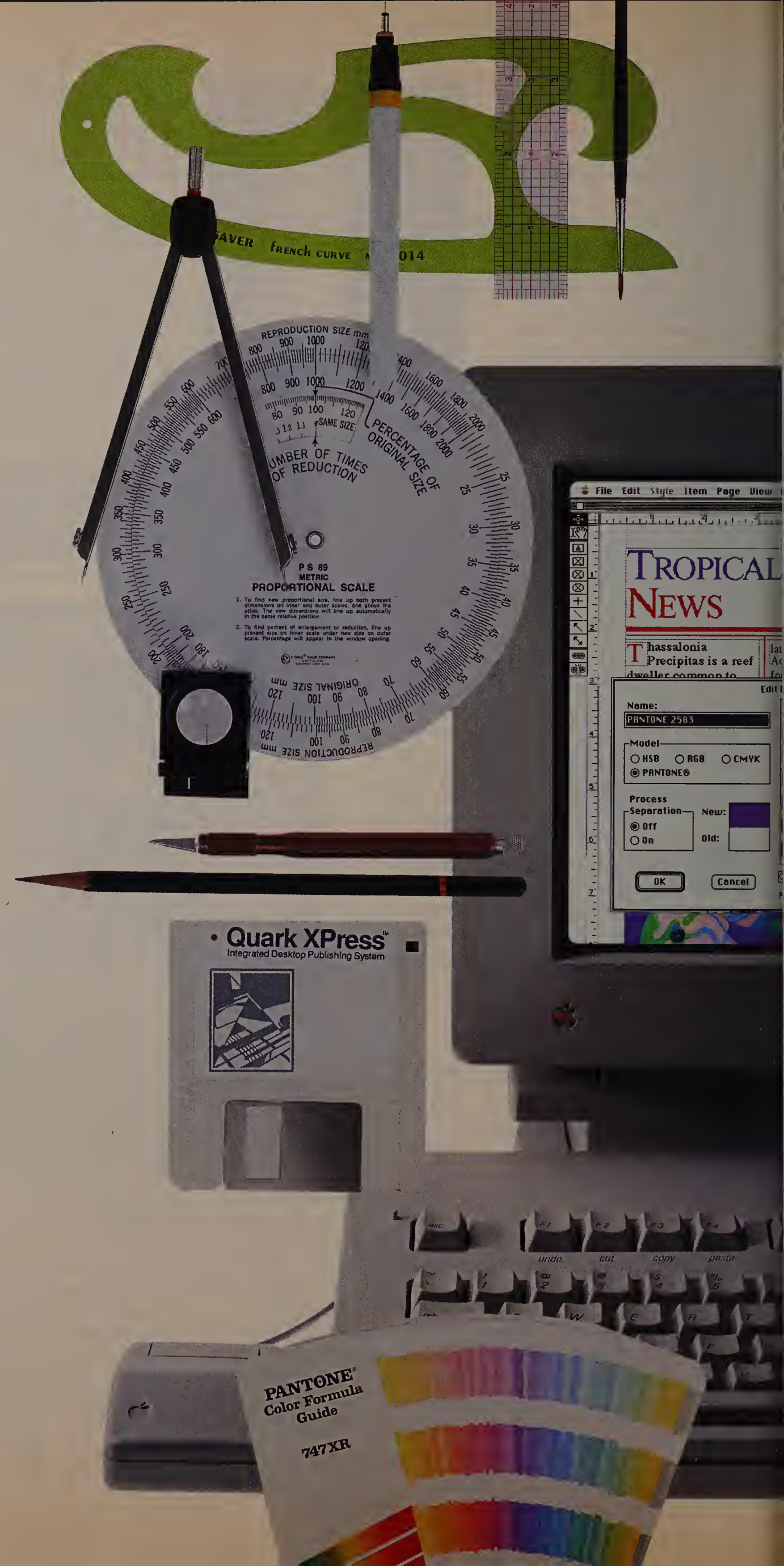

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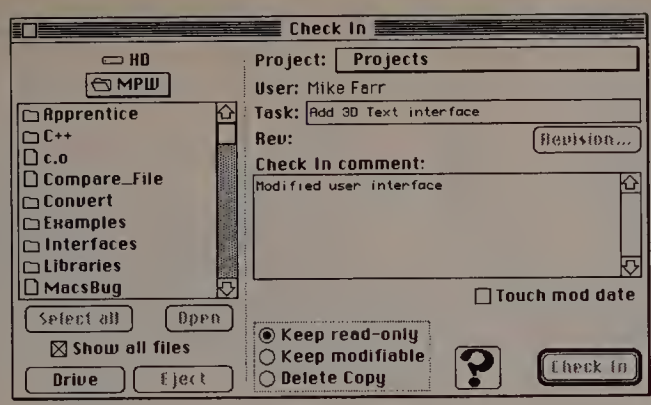


MPW 3.0, the newest version of Apple's principal program-development system, features performance improvements and new options.

eral new attributes. It has a simplified architecture that makes it easier to have windows and dialog boxes work together. Views can now be built graphically from component objects; a view editor automatically creates the necessary resources that MacApp procedures use to draw and manage a view. MacApp 2.0 can also create applications that work in the background under MultiFinder. In addition, a new object-inspector feature discloses the properties of objects. Data sheets and MacApp itself are available from APDA.—*Lon Poole*

Developer Developments

Programmers can now get new or newly revised Macintosh program development products from Apple, including the Macintosh Programmer's Workshop (MPW) version 3.0.

MPW 3.0, the newest version of Apple's principal Macintosh program-development system, features performance improvements along with new options such as Projector, a set of commands for managing a software project; SADE (Symbolic Application Development Environment), a new source-level debugging environment; and a completely new C compiler. There are new tools for selecting AppleTalk network services from the command line, sorting lines in a file, and creating HyperCard XCMD and XFCN resources. Users can run all MPW 3.0 tools in the background via MultiFinder and also share them over a network file server. MPW is available in various configurations through APDA, and is included with many programming languages sold by third parties.

Projector helps control and track changes to source code, documentation, and any other files associated with a software-development project. A member of the development team can check out files to prevent other team members from changing them until the files are returned. Projector maintains the revision history of a project's files in a tree structure, so that anyone can create a new branch without affecting primary development work. Projector can rebuild a version of the project that existed on a particular date.

SADE lets programmers debug programs at the source-code level. It works with the new versions of the MPW Pascal and C compilers and with the MPW assembler. Other vendors have announced SADE support in new versions of their compilers, including Absoft MacFortran/MPW, Language Systems FORTRAN, SemperSoft Modula 2, and TML Pascal II. SADE features multiple windows, changeable menus, and a scripting language. Predefined menus let you set breakpoints, single-step, view variable values, and dump structures with format intact. The scripting language has its own variables and control commands so you can run extensive tests automatically, set up interruptable test procedures, and control the debugging environment. SADE runs under MultiFinder separately from the program being debugged.

The new C compiler in MPW 3.0 contains American National Standards Institute (ANSI) C features such as function prototypes and strong type checking, as well as ANSI C additions to the standard library.
—*Lon Poole*

APDA Turnover

Apple has taken over operation of APDA, the membership organization that sells program development languages, tools, utilities, and documentation from Apple and other companies.

Apple plans no major changes in APDA. The organization's quarterly publication, *APDAlog,* will be redesigned to make product descriptions easier to read. Also, Apple will control manufacture of Apple-label products distributed by APDA. But for most of the 21,000 current members, the chief adjustment will be new addresses and phone numbers:

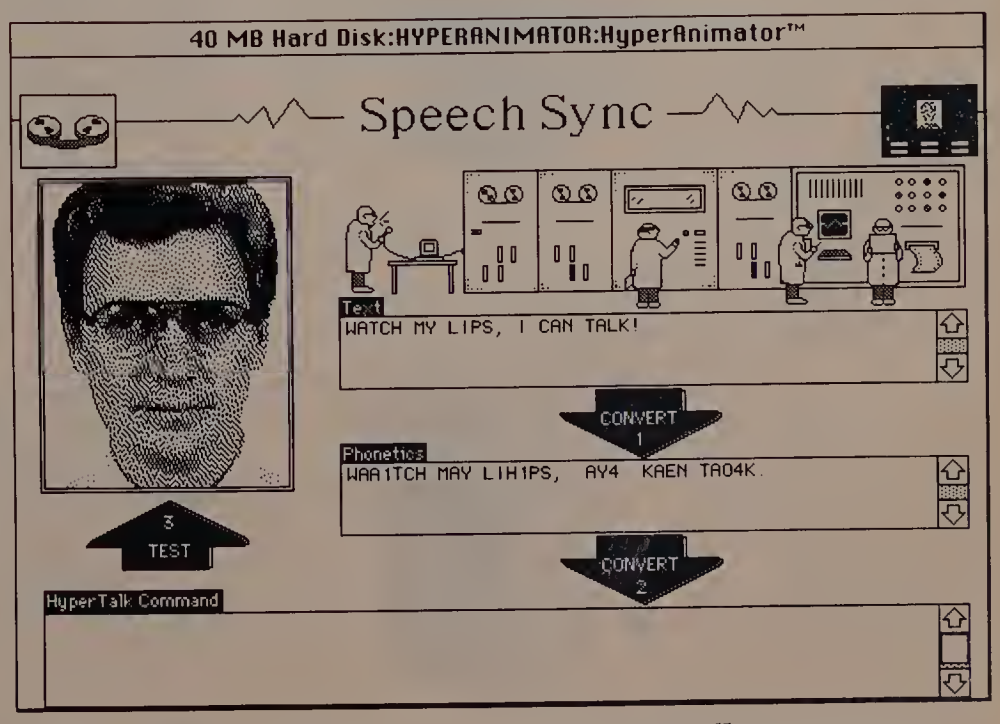
APDA
Apple Computer, Inc.
20525 Mariani Ave., M/S 33G
Cupertino, CA 95014
800/282-2732
Telex: 171-576
Fax: 408/562-3971
AppleLink: 2732
CompuServe: 766,2045
MCI Mail: Postrom
GEnie: XTX03077

Annual membership fees are $20 in the United States, $25 in Canada and Mexico, and $35 for all other countries. All existing memberships remain valid until their expiration dates.
—*Lon Poole*

HyperAnimator

"Hello, this is your mother," says the image on your computer screen. Looks like Mom and talks like Mom, though her lips move a bit jerkily and her voice suffers slightly from digitization. Is this a sweet dream or a nightmare? Either way, BrightStar Technology has the soft-

(continues)



HyperAnimator makes on-screen characters talk; you can scan the faces in or choose from a stable of nine "actors" included in the program.

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8½" × 11" format, 10 pages/min.
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PostScript Interpreter
8Mb RAM, 40Mb font disk for approx. 200 fonts
35 fonts standard
91Mb Page Buffer Winchester
Optional disk for approx. 500 fonts

4200P
1200 dpi photo-media imagesetter
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PostScript Interpreter
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40Mb Page Buffer Winchester
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Whether you want your output on plain paper or photo-media, Varityper is the #1 choice for PostScript Imagesetters.

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Varityper is the only supplier to offer a choice of four high-resolution imagesetters with Adobe's PostScript interpreter: two with 600 dpi plain paper output . . . the VT600P for up to 8½″ × 11″ sheets and the VT600W for up to 11″ × 17″ sheets . . . and two with photo-media output . . . the 4200P for 1200 dpi and the 4300P for 1200 to 2400 dpi. All the choices for your precise needs.

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In head-to-head comparisons, our PostScript imagesetters are competitively priced and the fastest on earth! Varityper is the #1 choice when you can't afford to wait and you want to pay less.

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No matter what your needs, Varityper has an imagesetter which will give you the best resolution per dollar and the accuracy of systems that cost 1/3 more! Varityper full-page processing avoids the inevitable banding problems associated with other imagesetters which employ partial page processing "start/stop" schemes.

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Varityper imagesetters come complete with Apple LocalTalk, a Centronics parallel and RS-232 serial ports giving you the choice to use an Apple Macintosh, any IBM or compatible microcomputer or other publishing system using any software producing PostScript format output (e.g. PageMaker, XPress or Ventura Publisher). You can even use any vendor's PostScript-formatted type faces. With Varityper you can handle a multitude of applications. You are governed by the job and not by the limitations of the equipment.

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"The perfect place to put your computer to work."

—Apple Computer

That's what Apple had to say about MacTable in their Apple Collection™ catalog.

It's also the *only* table chosen for The Apple Collection. And for good reason. Because MacTable isn't just a computer stand, it's a full-fledged workstation built around the Macintosh.

Cabinet becomes platform for LaserWriter. Holds disks, manuals, and a full carton of paper.

It has a place for everything. Hard disk, second drive, modem, keyboard, mouse, ImageWriter, and LaserWriter. Yet even with a full complement of gear, there's room to spread out for serious work.

Every surface interchangeable

Each of MacTable's four surfaces can be independently tilted and interchanged to fit every Mac made: Plus, SE, or Mac II. You can even make it right- or left-handed. So it accommodates any peripheral you'll ever have at comfortable working and viewing angles.

Stands the test of time

MacTable is meticulously built by craftsmen using pure beechwood and durable laminates. Its sturdy design and quality materials support

Interchangeable surfaces offer configurations for every size Mac.

even the heaviest equipment. And MacTable's platinum gray surfaces match Mac equipment perfectly.

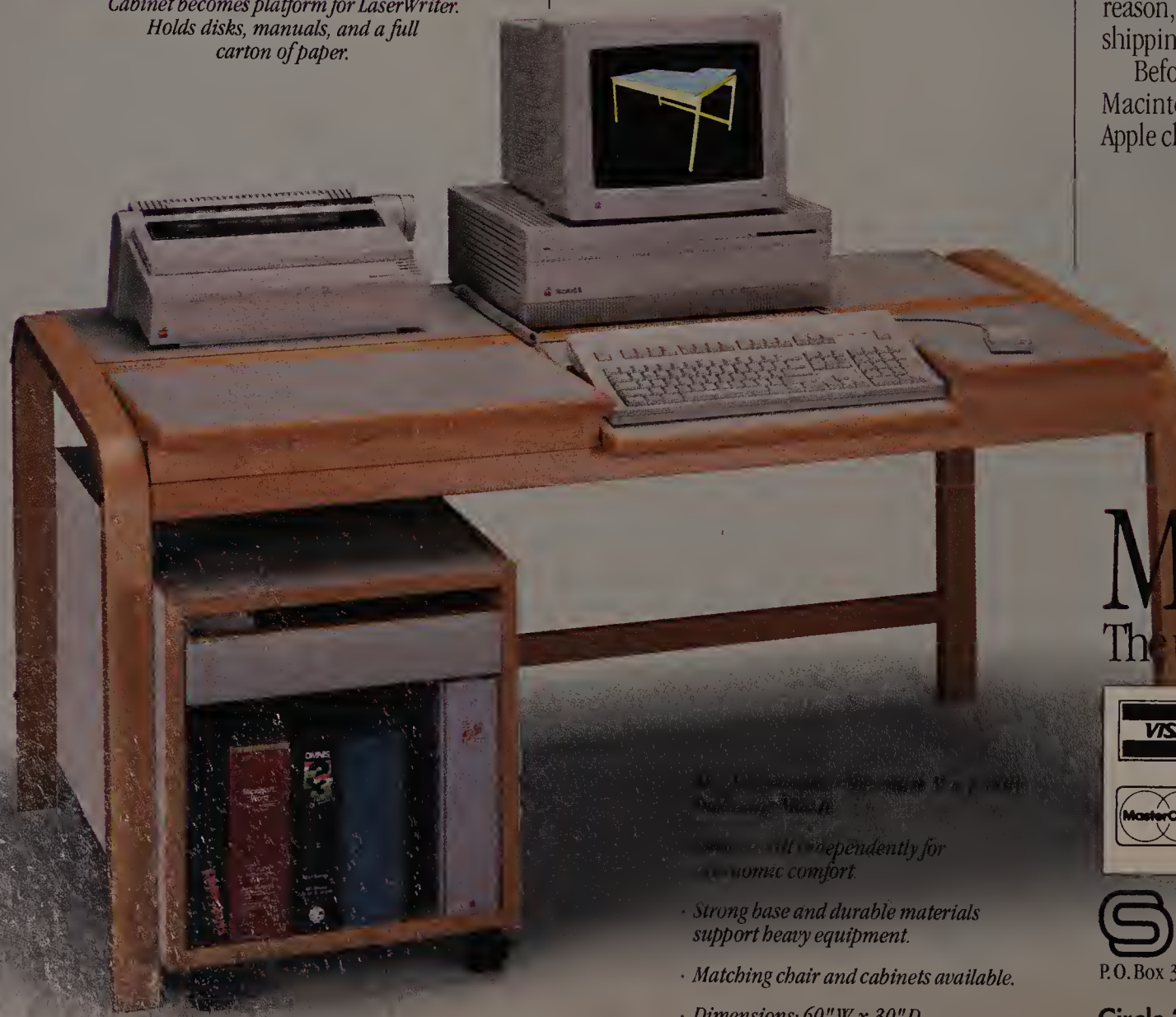
Matching roll-away cabinet

The free-standing cabinet (optional) is big enough to use as a stand for your LaserWriter or CPU. It features easy-glide locking casters and space for full-size binders. Plus a whole carton of paper. A special place in the locking drawer holds over 100 disks upright and secure.

A great price

MacTable is an incredible value. Just $289 when you buy directly from ScanCo. Add the sturdy matching cabinet for $139 more. And if you're not satisfied with MacTable for any reason, return it for a prompt refund (less shipping).

Before you buy an ordinary table for your Macintosh, think again. Then get the table Apple chose.



- *[illegible] independently for [illegible] comfort.*
- *Strong base and durable materials support heavy equipment.*
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- *Dimensions: 60" W x 30" D.*

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ware to make it come true. The company's HyperAnimator lets you paint or scan in faces and then type whatever you want them to say; the text is automatically converted to speech synchronized with the lip movements. Mom's voice won't sound like hers, however, unless you can get her to digitize it and give you the disk. If you simply type in her words, she'll sound distinctly computerish. If you don't have time to draw or scan faces, you can use the stable of nine characters provided by BrightStar.

HyperAnimator's best advance man, however, is probably Albert, a talking head starring in Disney's new version of "The Absent-Minded Professor," seen on Sunday nights as part of "The World of Disney" TV series. Software developers Jay Johnson and Harry Anderson created Albert to play the professor's electronic sidekick.

BrightStar has also added the HyperAnimator's audio feature to an E-mail package called HyperMail, which lets your animated coworkers deliver their messages in persona.

HyperAnimator lists for $149.95. For further information, contact BrightStar Technology, in Bellevue, Washington, at 206/885-5446.
–Ann Garrison

TokaMack

The U.S. Department of Energy is betting on a Columbia University laboratory team that uses a Mac in its search for safer nuclear energy. The team, led by Assistant Professor Michael Mauel, is testing the effectiveness of using magnetic force fields to confine hydrogen *plasma*—very hot, ionized gases—heated to temperatures above 1 million degrees. The plasma created in the experiments looks like rings of lightning and lasts for 200 millionths of a second each time it appears. During every flash of the lightning ring, laser beams and magnetic sensors measure the dynamics of the ring at least once every millionth of a second, producing more than a megabyte of data.

The data is digitized, loaded into VAX computers, transferred to Macs, and then analyzed with TokaMack, an application Mauel wrote using Apple's Macintosh Programmer's Workshop (MPW) and MacApp. The analysis also involves four Cray computers located at the Lawrence Livermore National Laboratory in California and networked to the Columbia lab's VAX and Macs with a high-speed, national satellite link.

Mauel and his graduate students have used TokaMack and the data from their experiments to create the first illustration of the structure of magnetohydrodynamic instabilities, called kinks, occurring in the plasma ring at very high pressure.

TokaMack is named after Tokamak, an earlier device developed by the late Russian physicist L. A. Artsimovich for magnetically confining ring lightning. Mauel offers the software as freeware to scientists doing similar research throughout the world. TokaMack requires a Mac II.

For further information, contact Michael Mauel at Columbia University, at 212/854-4455.
–Ann Garrison

JONATHAN LEVINE

Columbia professor Michael Mauel leads a team using Macs to test the use of magnetic force fields to confine hydrogen plasma.

No Excuses

Shareware users now have a more convenient way to do the right thing and pay for it. And not a moment too soon when you consider that only an estimated 5 percent of the fees owed to shareware developers are ever received. Users of the Connect Professional Information Network (accessed from the Mac with MacNet software) can now download shareware, register it, and be billed on their monthly statements.

Shareware programs, available in the Mac Symposium public forum, are still available to users for downloading and perusal. However, a folder of registration forms is now available for users who choose to keep a shareware program. All you need to do is download the appropriate registration form, fill it out, and E-mail it back to the authors or their representatives at Connect. Big brother still can't see you—unless you download the registration form, there is no way to determine whether you've kept a program or not.

Shareware authors receive monthly checks equal to 60 percent of the fees collected for their shareware over the billing period. Connect takes a 30 percent cut, and Mac Symposium keeps 10 percent to cover administrative costs. Mac Symposium operators hope that this system will increase the number of users who actually pay for shareware, help maintain the high quality of shareware offerings, and reform computer scofflaws everywhere. For more information, call Connect, in Cupertino, California, at 408/973-0110 or log on to the Mac Symposium on Connect.
–Liza Weiman

(continues)

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1 *A classic arch becomes the anchor for this surreal composition. After eliminating unwanted areas, a stairstep design is added.*

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SILICON BEACH
SOFTWARE

Here Come the Cards

Now that the new SE/30 supports color, third-party color video cards are on the way. Among the first is SuperMac's Spectrum/8 Series II. It has a 16.8-million-color palette and 1MB of VideoRAM that can be set for 1-, 2-, 4-, or 8-bit color or gray scale. The card now supports Apple's 12-inch gray-scale monitor, Apple's 13-inch color monitor, and a series of SuperMac displays including a 19-inch Trinitron color monitor, a 19-inch standard color monitor, a 16-inch Trinitron color monitor, and a 19-inch gray-scale monitor.

The Spectrum/8 Series II also supports side-by-side operation of both an add-on monitor and the SE/30's monitor. The new card will represent a virtual screen much larger than that of the monitor's actual screen; virtual screen sizes are 4096 by 1792 pixels at 1 bit per pixel, 2048 by 1792 at 2 bits, 2048 by 896 at 4 bits, and 1024 by 896 at 8 bits. Pan and zoom features let users automatically pan across the entire virtual screen and zoom in on views enlarged by a factor of two, in all modes.

The Spectrum/8 Series II lists for $1895. For further information, contact SuperMac, in Mountain View, California, at 415/964-9694.—*Ann Garrison*

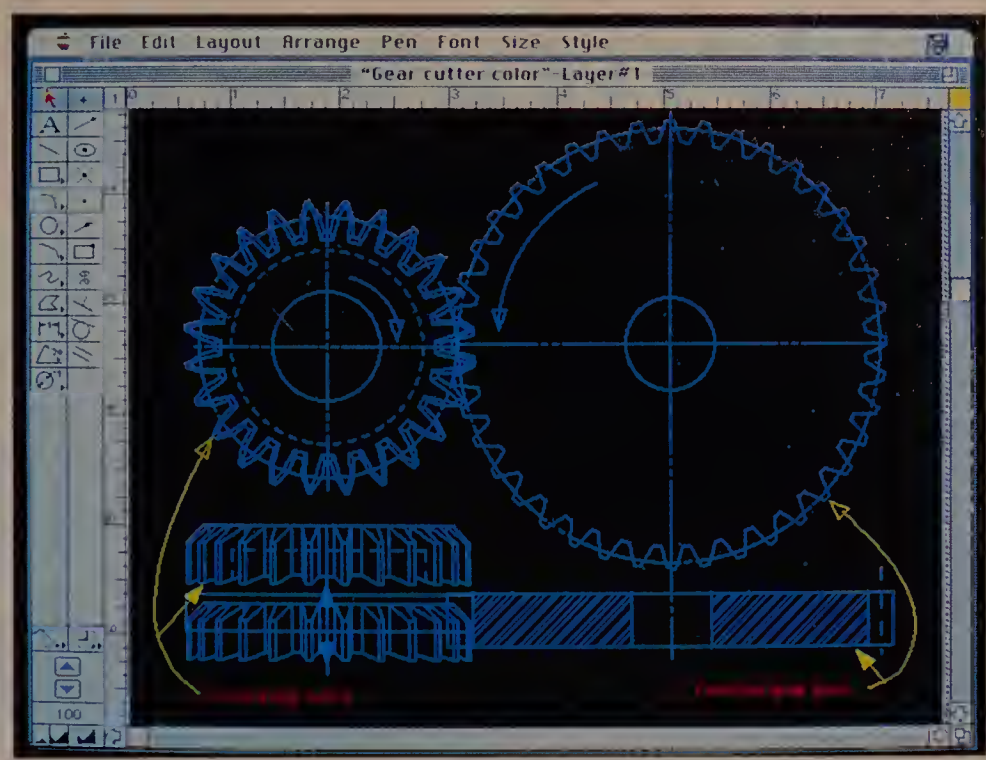
ROBERT HOLMGREN

SuperMac founder and chief scientist Steve Edelman headed the team that developed the first color card for the SE/30.

New MacWrite and MacDraw

Claris Corporation's software developers have been hard at it: in February the company released MacWrite II, its new version of MacWrite, and MacDraw II 1.1. The company also unveiled Claris CAD in January, and its SmartForm Series in December of last year.

MacWrite II has more than 50 new features, including mail merge and extensive online help. It lets you create up to 30 custom type styles by selecting the font, size, special attributes, and even color that make up each style, and then adding each style to the menu for later use. The program also lets you exchange files with five other popular word processors without translation to and from ASCII; the special characters are automatically translated.



Claris CAD is a 2-D design and drafting tool with a customizable drawing environment.

MacWrite II lists for $249, with the upgrade cost depending on which version of MacWrite users already have.

MacDraw II 1.1, the upgrade to Claris's drawing package, includes the power to create multiple, overlapping transparent layers within files; the layers can be hidden, shown, and rearranged in any order. For example, the foundation, framing, roofing, and wiring of a house could all be layers within one file.

Claris has also incorporated a slide manager for previewing, sorting, and showing slides and printing handouts for presentations. Also new are on-screen stick-on notes (like Post-it notes) that can be hidden or shown, printed or not printed. The program also offers export capabilities through the PICT2 format, for transferring color graphics from one file to another without using the Clipboard. MacDraw's list price is $399; registered MacDraw II 1.0 and original MacDraw owners can upgrade to version 1.1 for $25 and $200, respectively.

Claris CAD is a 2-D design and drafting tool that features a customizable drawing environment, automatic dimensioning with associative redimensioning, and the power to import and export files in PICT, IGES, or DXF formats. It lists for $799 including a tutorial videotape and workbook. The IGES and DXF translators are optional at $299.

The SmartForm Series includes two applications for easing the pain of paperwork. You can use SmartForm Designer to create forms such as expense reports, invoices, tickets, and mailing labels; and SmartForm Assistant to fill out forms created with SmartForm Designer. SmartForm Designer lists for $399, including a single-use copy of SmartForm Assistant. SmartForm Assistant lists for $49 for one copy, $399 for ten copies, or $500 for a 100-user license.

For further information, contact Claris Corporation, in Mountain View, California, at 415/960-1500.—*Ann Garrison*

Announcing another

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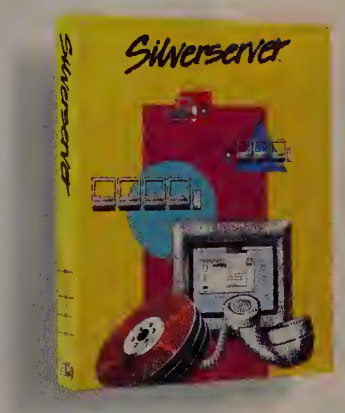

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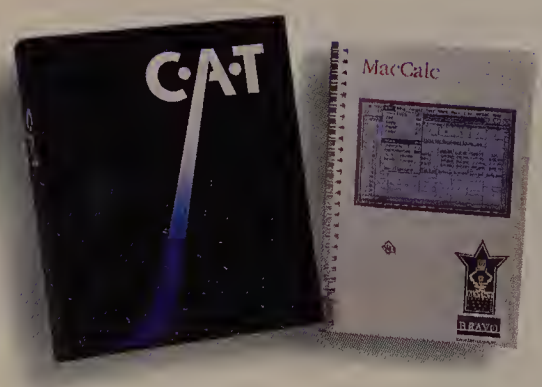

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3470 MacInTax 1988..... 65.

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4195 FoxBASE+/Mac 1.1..... 208.
4580 FoxBASE+/Runtime 1.1..... 158.
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2865 Excel 1.5..... 255.

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3013 Double Helix II 2.0R51..... 339.

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3965 WetPaint For Publishing (3-4) ..... 45.
3966 WetPaint Animal Kingdom (5-6).... 45.
3967 WetPaint Special Occasions (7-8) .. 45.
3968 WetPaint Printer's Helper (9-10).... 45.
3969 WetPaint Industrial Revolution (11-12) .. 45.
3970 WetPaint Old Earth Almanac (13-14)... 45.
3971 WetPaint Island Life (15-16)..... 45.

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2385 Comic People..... 25.

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2645 MacChinese Mandarin ..... 79.

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4825 78 Universal News Com/Greek..... 95.
4826 79 Avenir 1 ..... 182.
4827 80 Avenir 2 ..... 182.
4828 81 Bauhaus ..... 125.
4829 82 Antique Olive ..... 125.

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4751 Persuasion 1.0 ..... 389.
1331 PageMaker 3.01 ..... 399.

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4709 LetraStudio 1.0 . . . . . 289.

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3230 Quark XPress 2.0 . . . . . 499.

Springboard
3530 Certificate Maker 2.0 . . . . . 24.
4497 Top Honors . . . . . 59.
4500 Springboard Publisher 1.0 . . . . . 109.

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3420 Lightspeed C 3.01 . . . . . 95.

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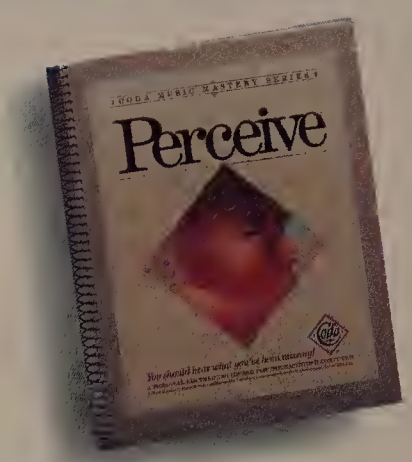

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3953 FastBack Mac 1.3 . . . . . 54.

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4683 Hard Disk DeadBolt 1.0 . . . . . 53.
2231 Hard Disk Util 2.03 . . . . . 53.

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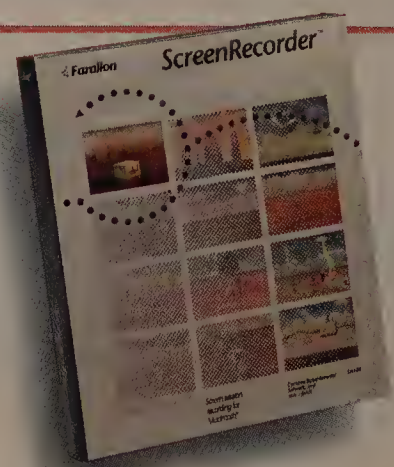
4729 S.U.M. 1.02 . . . . . 59.



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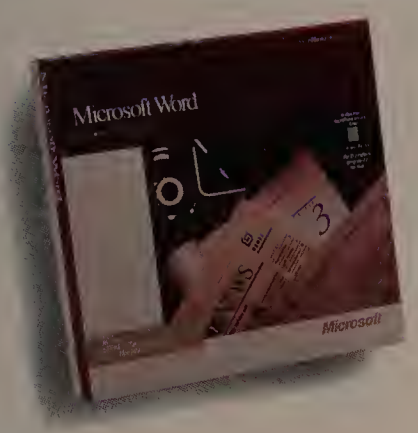

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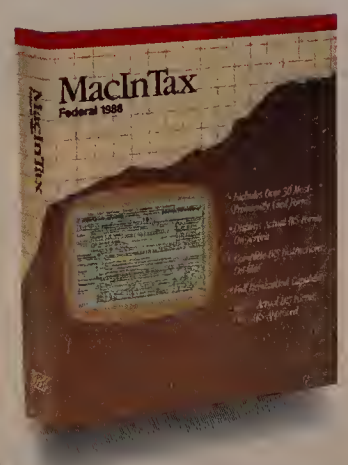
3752 Decimal Dungeon *(CP)*. . . . . 27.



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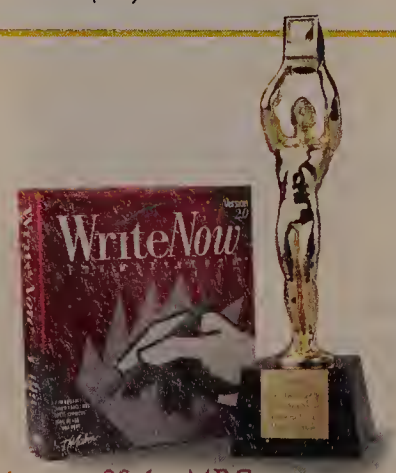
3753 Fraction Action *(CP)* . . . . . $27.
3755 Mac Robots *(CP)* . . . . . 27.
3756 Math Wizard *(CP)* . . . . . 27.
3754 Read-A-Rama *(CP)* . . . . . 32.

ENTERTAINMENT

Access Software
4655 World Class Leader Board Golf . . . . 28.
Accolade
1184 Hardball *(CP)* . . . . . 23.
4484 Mean 18 *(CP)* . . . . . 24.
Activision
4475 Quarterstaff *(CP)* . . . . . 30.
4486 Manhole . . . . . 30.
4592 Zork Zero *(CP)* . . . . . 36.
Addison-Wesley
4407 The Hobbit . . . . . 24.
4474 Fellowship of the Ring . . . . . 24.
Broderbund Software
4099 Shufflepuck Cafe *(CP, air hockey)* . . 24.
4111 Moebius *(CP, adventure & arcade)* . 24.
4229 Where is Carmen San Diego? *(CP)* . . 27.
1421 Ancient Art of War *(CP)* . . . . . 27.
4540 Ancient Art of War at Sea *(CP)* . . . . . 27.
Bullseye
1544 Ferrari Grand Prix *(CP)* . . . . . 32.
4074 P51 Mustang Flight Simulator *(CP)* . . 32.
★Casady & Greene ... 60 day MBG
2268 Crystal Quest 2.2C *(CP)* . . . . . 26.
4119 Crystal Quest w/Critter Editor 2.2C . . 42.
★Discovery Software ... 30 day MBG
4408 Arkanoid . . . . . 27.
Electronic Arts
1850 Reach for the Stars *(CP)* . . . . . 26.
1842 Chessmaster 2000 *(CP)* . . . . . 28.
4064 Chuck Yeager Flight Simulator *(CP)* . 32.
4588 Life & Death *(CP, surgery simulation)*. 32.
Epyx
2037 Sub Battle Simulator . . . . . 29.
4660 Sub Battle Simulator for Mac II . . . . . 29.
Infinity Software
2518 GO *(CP)* . . . . . 27.
2519 Grand Slam Tennis *(CP)* . . . . . 27.
Micro Sports
2787 MSFL Pro League Football . . . . . 32.
MicroProse
4697 Pirates! *(CP)* . . . . . 32.

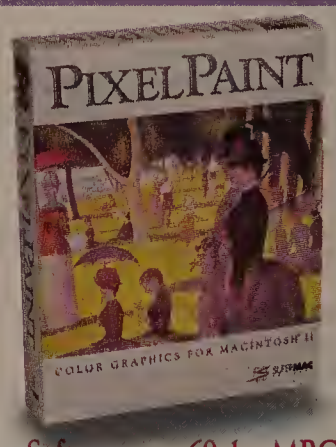


T/Maker ... 30 day MBG
Write Now 2.0–Blends simplicity with power and performance. 2.0 has over 50 new features including mail merge, a 100,000 word spelling dictionary, direct import and export of Text, MacWrite, & RTF (Word option) . . . . . $109.

Microsoft
2868 Flight Simulator *(CP)* . . . . . $33.
Miles Computing
2764 Down Hill Racer *(CP)* . . . . . 24.
2767 Harrier Strike Mission II *(CP)* . . . . . 32.
2765 Fool's Errand *(CP)* . . . . . 32.
Mindscape
4083 Balance of Power 1990 *(CP)* . . . . . 30.
3987 Colony *(CP)* . . . . . 30.
2743 Crossword Magic *(CP)* . . . . . 30.
2745 Deja Vu *(CP)* . . . . . 30.
4596 Deja Vu II *(CP)* . . . . . 30.
2749 Shadowgate *(CP)* . . . . . 30.
2750 Trust & Betrayal: Legacy of Siboot *(CP)*. 30.
2751 Uninvited *(CP)* . . . . . 30.
New World Computing
4490 Might and Magic *(CP)* . . . . . 36.
PBI Software
3110 Strategic Conquest Plus 1.3 *(CP)* . . 35.
PCAI
3144 MacGolf 2.0 *(CP)* . . . . . 35.
4320 MacGolf Classic *(CP)* . . . . . 54.
4321 Lunar Rescue *(CP)* . . . . . 34.
4517 Road Racer *(CP)* . . . . . 39.

Bogas Productions ... 60 day MBG
Super Studio Session–Awarded 1988 Macworld Reader Poll Music Software of the Year. Eight voice upgrade and 93 instrument files. . . . $75.
Music Disks Special–Rock, Country, String, & Sound Effects. Price thru April 30, 1989 . . 39.

Primera Software
3169 Smash Hit Racquetball II . . . . . 22.
Sierra On-Line
4161 Mother Goose *(CP)* . . . . . 19.
3397 Leisure Suit Larry *(CP)* . . . . . 23.
3394 King's Quest I *(CP)* . . . . . 29.
3395 King's Quest II *(CP)* . . . . . 29.
3396 King's Quest III *(CP)* . . . . . 29.
3398 Police Quest *(CP)* . . . . . 29.
3399 Space Quest *(CP)* . . . . . 29.
3400 Space Quest II *(CP)* . . . . . 29.
★Silicon Beach ... 60 day MBG
3501 Apache Strike . . . . . 27.
3503 Dark Castle . . . . . 27.
3502 Beyond Dark Castle . . . . . 27.
3508 World Builder . . . . . 41.
★Simon & Schuster ... 60 day MBG
3303 Star Trek Kobayashi Alternative *(CP)* 24.
3304 Star Trek Promethian Prophecy *(CP)* 24.
Sir-Tech
3347 Mac Wizardry *(CP)* . . . . . 35.
★Softstream, Inc. ... 60 day MBG
4071 Mac•Man *(w/adapter)* . . . . . 24.
4072 The Solitaire DA . . . . . 24.



SuperMac Software ... 60 day MBG
Pixel Paint 2.0–New version includes PANTONE colors, color separation and halftoning. Masking tools, and special effects like smoothing, blending and dithering make for a sophisticated 8-bit paint program . . . . . $199.

4073 Colour Billiards . . . . . 35.
4078 Game Pak *(above 3 titles)* . . . . . 75.
Spectrum Holobyte
4001 Solitaire Royale *(for Mac II)* . . . . . 20.
4175 Solitaire Royale *(for Mac SE)* . . . . . 20.
3464 Tetris . . . . . 20.
4472 Tetris *(color version)* . . . . . 24.
3460 GATO . . . . . 26.
3461 Orbitor . . . . . 26.
3462 PT-109 . . . . . 26.
3459 Falcon 2.0 . . . . . 32.
Spinnaker
2328 Sargon IV *(CP)* . . . . . 29.
SubLogic
4698 Jet *(CP)* . . . . . 32.

HARDWARE

NETWORKS & COMMUNICATIONS

★Abaton ... 30 day MBG
4589 InterFAX Modem . . . . . 329.
★CE Software ... 60 day MBG
3963 QuickMail 1.05 . . . . . 159.
★CompuServe ... 60 day MBG
1671 Grolier's Online Encyclopedia . . . . . 19.
1676 CompuServe Information Service . . 24.
1673 CompuServe Navigator 2.02 . . . . . 45.
1674 Standard Service/Navigator Bundle 59.
★DataViz ... 60 day MBG
1823 MacLink Plus 3.0 . . . . . 145.
4842 MacLink Plus/Translators . . . . . 119.
★Dove Computer ... 60 day MBG
FastNet networking products . . . . . call
★Dow Jones ... 30 day MBG
1789 Dow Jones Membership Kit . . . . . 24.
1785 Desktop Express 1.03 . . . . . 95.
1786 Market Manager Plus 2.0 . . . . . 189.
★Farallon Computing ... 60 day MBG
4208 Timbuktu 2.0.1 (no MBG) . . . . . 69.
4866 Timbuktu Remote (no MBG) . . . . . 195.
4867 Timbuktu 30-Pack (no MBG) . . . . 1395.
2201 TrafficWatch 1.08 (no MBG) . . . . . 145.
2202 PhoneNET-AppleTalk 120 adapter . . . 9.
2203 PhoneNET PLUS *(DIN-8)* . . . . . 35.
2204 PhoneNET PLUS *(DB-9)* . . . . . 35.
2205 PhoneNET Punch Down Block . . . . 69.

and your order's filled.

4869 PhoneNET Connector 10-Pack . . $225.
4868 PhoneNET Repeater . . . . . 325.
2206 PhoneNET StarController . . . . . 1199.

★Freesoft ... 60 day MBG

2219 Red Ryder 10.3 . . . . . 54.

Hayes

2300 Smartcom II 3.0B . . . . . 88.
2307 Smartmodem 2400. . . . . 449.

★Infosphere ... 30 day MBG

2513 LaserServe 2.0 . . . . . 62.
2514 MacServe 2.4 . . . . . 155.
4595 Liaison 1.0A . . . . . 185.

Insignia

4089 SoftPC 1.2 . . . . . 479.

★LaCie ... 30 day MBG

4335 SilverServer 1.11 . . . . . 89.

Microsoft

2875 Microsoft Mail 1.36 (1-4 users). . . . 195.
2872 Microsoft Mail 1.36 (5-10 users). . . 325.
2873 Microsoft Mail 1.36 (11-20 users). . 489.
2874 Microsoft Mail 1.36 (21-32 users). . 639.

★Nuvotech ... 60 day MBG

3000 TurboNet ST *(DIN-8)* . . . . . 30.
3001 TurboNet ST *(DB-9)*. . . . . 30.

★Olduvai Software ... 60 day MBG

4503 MultiClip. . . . . 36.
3030 FontShare 1.1 . . . . . 149.

★Practical Peripherals ... 30 day MBG

3100 1200 Baud External Modem . . . . . 79.
3102 2400 Baud External Modem . . . . . 181.
3089 Mac Communications Pack . . . . . 229.

★Shiva ... 30 day MBG

4347 NetBridge. . . . . 279.
3444 NetSerial X232 . . . . . 289.
3443 NetModem V2400 . . . . . 479.

★Software Ventures ... 30 day MBG

3454 Microphone 1.5. . . . . 119.
3455 Microphone II 2.0 . . . . . 225.

★Solutions, Intl. ... 60 day MBG

4308 BackFAX *(reqs. Apple FAX modem)*. 129.

★Synergy ... 30 day MBG

3130 VersaTerm 3.20. . . . . 65.
3131 VersaTerm-PRO 3.0. . . . . 195.

★TOPS ... 30 day MBG

3723 TOPS Mac 2.1. . . . . 149.
3726 TOPS for DOS 2.1 . . . . . 119.
3724 NetPrint 2.0. . . . . 119.
4715 InBox Connection Mac 2.2 . . . . . 75.

Microsoft
File 2.0–Intuitive database handles large numbers of records with ease. Integrates with Word to develop mailing lists and customized form letters. Predesigned templates print common forms & labels.. . . . . $129.

4714 InBox Starter Kit 2.2 . . . . . $199.
4188 TOPS Teleconnector *(DIN-8)* . . . . . 39.
4189 TOPS Teleconnector *(DB-9)*. . . . . 39.
4598 TOPS FlashBox. . . . . 125.
3725 TOPS Repeater. . . . . 129.
3720 TOPS Flashcard . . . . . 169.

★Traveling Software ... 60 day MBG

3729 LAP-LINK Mac 2.0 . . . . . 84.

INPUT/OUTPUT

★Abaton ... 30 day MBG

1188 ProPoint ADB . . . . . 89.

Caere

4476 OmniPage 1.0 . . . . . 565.

★Cutting Edge ... 30 day MBG

3988 CE 105ADB Keyboard w/QuicKeys . 149.

★Datadesk ... 30 day MBG

1819 MAC-101 Keyboard *(beige)*. . . . . 145.
1820 MAC-101 Keyboard *(platinum)* . . . 145.
1821 MAC-101 Keyboard *(ADB)*. . . . . 145.

★Ex Machina ... 30 day MBG

4843 WristMac . . . . . 149.

Aatrix ... 30 day MBG
Payroll Plus–Handles from the simple to the complex: prints Form 1099, allows different hourly types, unlimited number of employees, and intergrates with other accounting and spreadsheet programs. . . . . $159.

★Kensington ... 30 day MBG

2576 New Turbo Mouse for Mac Plus. . . 109.
2547 New Turbo Mouse ADB. . . . . 109.

Koala Technologies

4845 MacDirector . . . . . 115.
2593 MacVision 2.0. . . . . 219.

★Kraft Systems ... 60 day MBG

2600 3-Button QuickStick . . . . . 39.
4082 3-Button QuickStick ADB . . . . . 51.

Kurta

2604 IS ADB Tablet . . . . . 255.
2605 Cordless 4 Button Cursor . . . . . 65.

★LYNX Computer ... 30 day MBG

1211 Quadlynx Trackball *(non ADB)* . . . . 65.
1212 Turbo Trackball ADB . . . . . 65.

★Mobius Tech. ... 60 day MBG

4846 MultiScreen . . . . . call

★MSC Technologies ... 30 day MBG

2808 A+ Mouse . . . . . 65.
2809 A+ Mouse ADB . . . . . 85.

★Nutmeg Systems ... 30 day MBG

4849 LCD Interface. . . . . 399.
2992 15″ Monitor for Mac Plus . . . . . call
2994 15″ Monitor for Mac SE . . .*special* 999.

Practical Peripherals ... 30 day MBG
Mac Communications Pack–Includes external 2400SA Modem, cable, and top-selling communication software. Hayes compatible, auto-answer. A superior value! . . . . . $229.

2993 15″ Monitor for Mac II . . . *special* 999.
4002 19″ Monitor for Mac Plus. . . . . 1349.
4096 19″ Monitor for Mac SE. . . . . 1349.
4097 19″ Monitor for Mac II . . . . . 1449.

Olduvai Software

3035 Read-It!TS 1.06 . . . . . 79.
3034 Read-It! 2.0. . . . . 199.

★Orange Micro ... 30 day MBG

4488 Grappler Spooler . . . . . 39.
3036 Grappler C/Mac/GS . . . . . 79.
4487 Grappler LS . . . . . 92.
4076 Grappler LQ . . . . . 103.

SoftStyle

3282 Printworks (Dot Matrix) 3.5 . . . . . 43.
3283 Printworks (HP laser) 3.5 . . . . . 85.

Summagraphics

4298 BitPad Plus ADB. . . . . 325.

★Thunderware ... 30 day MBG

3648 ThunderScan 5.0 with PowerPort . 189.
3646 MacPlus/SE Power Accessory . . . . 29.
3645 Mac II Power Accessory . . . . . 42.

MEMORY & DRIVES

1107 **1 Meg SIMMs** . . . . . call

AST Research

4666 Mac 86. . . . . 439.
1229 Mac 286 . . . . . 1079.

★Cutting Edge ... 30 day MBG

3989 800k Disk Drive *(platinum)* . . . . . 175.
3990 The Wedge XL 30+ SCSI. . . . . 579.
3991 The Wedge XL 45+ SCSI. . . . . 729.

★Dove Computer ... 60 day MBG

1801 SCSI Interface/Port . . . . . 109.
1807 MacSnap 524E. . . . . 289.
1809 MacSnap 524S . . . . . 379.
1811 MacSnap 548 . . . . . 499.
1812 MacSnap 548S . . . . . 589.
1800 MacSnap 2SE . . . . . 439.
1797 MacSnap Plus 2 . . . . . 439.
1803 1024 Option . . . . . 439.

ACCELERATOR BOARDS

1793 MaraThon 020 MSE1 . . . . . 585.
1794 MaraThon 020 MSE2 *(1 Meg)*. . . . 979.
1795 MaraThon 020 MSE3 *(math chip)*. 779.
1796 MaraThon 020 MSE4 *(1 Meg/chip)*. 1159.
4231 MaraThon 020 MSE4x4 . . . . . 2195.
4663 MaraThon 030 Accelerator 32 Mhz . 999.

Overnight.

★FWB Software ... 30 day MBG

4263 PocketHammer40 . . . . . $999.
4264 PocketHammer80. . . . . 1499.
4871 Hammer155 . . . . . 2899.
4000 Hammer300 . . . . . 3999.

PCPC

3177 HD-WSI *(Apple HD-20 to SCSI)* . . . . 269.
3181 MacBottom HD 21 SCSI . . . . . 659.
3180 MacBottom HD 21 w/Modem . . . . . 759.
3185 MacBottom HD 32 SCSI . . . . . 699.
3184 MacBottom HD 32 w/Modem . . . . . 829.
3189 MacBottom HD 45 SCSI . . . . . 859.
3188 MacBottom HD 45 w/Modem . . . . . 979.
3190 MacBottom HD 70 SCSI . . . . . 999.
4658 MacBottom HD 84 SCSI . . . . . 1249.
3176 MacBottom IHD 144 Meg . . . . . 1495.

DISKS

3297 **Sony** 3½″ DS/DD Disks. . . . . 18.
2214 **Fuji** 3½″ DS/DD Disks. . . . . 19.
2792 **MAXELL** 3½″ DS/DD Disks. . . . . 19.
3772 **Verbatim** 3½″ DS/DD Disks. . . . . 19.

ACCESSORIES

★Avery ... 60 day MBG

4864 3½″ Disk Labels *(Qty. 250)* . . . . . 13.
4865 3½″ x 15/16″ Address Labels *(Qty. 3750)* 15.
4811 8½″ x 11″ Transparencies *(Qty. 50)* 22.

★Computer Coverup ... 60 day MBG

1721 800K External Drive Cover . . . . . 4.
1723 ImageWriter II Cover. . . . . 8.
1722 ImageWriter LQ Cover . . . . . 8.
1720 Mac Plus Cover Set. . . . . 10.
1725 Mac SE Ext. Keyboard Cover Set . . 10.
4657 LaserWriter II Cover. . . . . 10.

★Ergotron ... 60 day MBG

2004 Mouse Cleaner 360° . . . . . 15.
3992 The Muzzle *(covers power outlet)* . . 62.
1998 MacTilt *(platinum)*. . . . . 68.
2000 MacTilt SE . . . . . 68.
4207 MacTilt for 13″ Monitor . . . . . 68.
1999 MacTilt Large . . . . . 85.

★Goldstein & Blair ... 30 day MBG

2267 *The Macintosh Bible* (2nd Edition). . 21.

★I/O Design ... 30 day MBG

2378 MacLuggage HDware . . . . . 49.

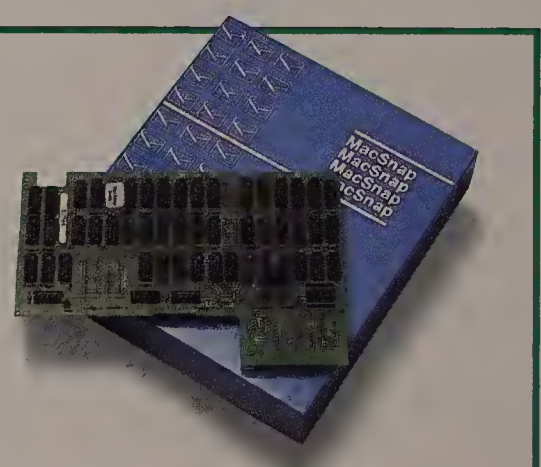
LYNX Computer ... 30 day MBG
Turbo Trackball–The ultimate cursor control and pointing device. Works on any surface, and has "lock" button for single click drags
Quadlynx Turbo Trackball (Non ADB) . . . . . $65.
Turbo Trackball ADB . . . . . 65.

2379 MacLuggage Imageware II. . . . . $49.
2376 MacLuggage Macinware Plus . . . . 64.
2381 MacLuggage Macinware SE. . . . . 75.

★Kensington ... 30 day MBG

MacConnection carries the entire line of Kensington's accessories. Partial listing below.

2577 Mouseway *(mouse pad)* . . . . . 8.
2569 Mac Plus or SE Cover . . . . . 9.
4126 LaserWriter II Cover. . . . . 17.
2589 Universal Printer Stand . . . . . 15.
2545 Universal Copy Stand . . . . . 22.
2556 Maccessories Anti-Glare Filter. . . . . 33.
2559 Apple Security System . . . . . 34.
2568 Maccessories SuperBase . . . . . 34.
2585 Printer Muffler 80 . . . . . 43.
2586 Printer Muffler 80 Stand . . . . . 24.
2583 Printer Muffler 132 . . . . . 58.
2584 Printer Muffler 132 Stand . . . . . 24.
4070 System Saver SE. . . . . 52.
2566 System Saver Mac *(platinum)* . . . . . 64.
2546 Maccessories A-B Box . . . . . 64.



Dove Computer ... 60 day MBG
MacSnap 548–Bring your old Mac into the future. Increase your Mac 512k's memory to a full 2 Meg. Easily installed. Patented socket technology allows better than Plus performance without soldering . . . . . $499.

4643 Mac II Stand and Cable Kit . . . . . 65.
2561 MasterPiece Mac II . . . . . 105.

★MacConnection ... 60 day MBG

4623 Solid Oak Disk Case, made by New England craftsman *(holds 90 disks)* . . . 29.

★Mobius Tech. ... 60 day MBG

4470 Fanny Mac QT . . . . . 65.

★Moustrak ... 60 day MBG

2694 Moustrak Pad *(standard 7″x9″)* . . . . 8.
2692 Moustrak Pad *(large 9″x11″)* . . . . . 9.
2693 Moustrak Pad L/F *(9″x11″)* . . . . . 10.
Moustrak Designer Series
(Features selected photos from the book, "A Day in the Life of America.")
4077 Window Washer 1 . . . . . 12.
4006 Thunderstorm 2 . . . . . 12.
4007 Old Cajun 3 . . . . . 12.
4008 Vietnam Memorial 4. . . . . 12.
4009 Dance Class 5 . . . . . 12.
4010 Tea Lesson 6 . . . . . 12.

Ribbons

3255 ImageWriter II Ribbon. . . . . 4.
3261 ImageWriter II 4-color Ribbon . . . . . 9.
3270 ImageWriter II Rainbow Six Pack. . . 20.
3260 ImageWriter LQ Black Ribbon. . . . . 17.

Cutting Edge ... 30 day MBG
800K External Disk Drive–Sleek, new drive features the latest in technology. Compatible with 512KE, Plus, and SE. Includes LED disk access light. . . . . $175.

★Simon & Schuster ... 60 day MBG

4230 *The Fully Powered Mac* book . . . . 24.

★Sopris Softworks ... 60 day MBG

4019 Mac SE & Ext. Keyboard Cover *(navy)* . 15.
4861 SE Standard Keyboard Protection Pak. 65.
4862 SE Extended Keyboard Protection Pak 75.
4012 High Trek ImageWriter II carry case. 49.
4013 High Trek Mac Plus carry case . . . . 59.
4014 High Trek Mac SE & ext. kybd. case 69.

★Targus ... 60 day MBG

3618 ImageWriter II Carry Case. . . . . 49.
3617 Mac Plus/SE Carry Case. . . . . 59.
4015 Mac SE & Ext. Kybd. Carry Case . . 69.

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- We accept VISA and MASTERCARD.
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- If we must ship a partial order, we never charge freight on the shipment(s) that complete the order.
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- All U.S. shipments insured; no additional charge.
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- Upon receipt and approval, personal and company checks now clear the same day for immediate shipment of your order.
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- 120 day limited warranty on all products. Defective software replaced immediately. Defective hardware repaired or replaced at our discretion. All items subject to availability. Prices subject to change without notice.
- To order, call us anytime Monday through Friday 9:00 to 9:00 EST, or Saturday 9:00 to 5:30 EST. You can call our business offices at 603/446-7711 Monday through Friday 9:00 to 5:30 EST.

SHIPPING

Continental US: Barring massive computer failures and other natural or unnatural catastrophes, all non-C.O.D. orders phoned into MacConnection by 8 PM EST will ship Airborne the same night for next day delivery, except for those within UPS Ground Zone 1 (which is also an overnight service). The total freight charge on any order placed with MacConnection is now $3. Backorders will also ship Airborne overnight at no additional charge. Some areas require an additional day delivery.
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"You guys are what's wrong with America."

Dear MacConnection,

A couple of weeks ago I had the sudden urge for a new Datadesk keyboard for my Macintosh Plus. Twelve hours later, I walked into my office and the keyboard was on the receptionist's desk. Instant gratification. No time to hunger after a new goodie. No wait, no muss, no fuss. This is *not* the spirit that built this fine country. Lincoln had to agonize through years of failure before he was elected President. Women had to wait 150 years for the right to vote. And here you are, indulging your customers' every whim in less than 24 hours. You guys are what's wrong with America.

You should be ashamed of yourselves.

Stephen Fleming
Sterling, VA

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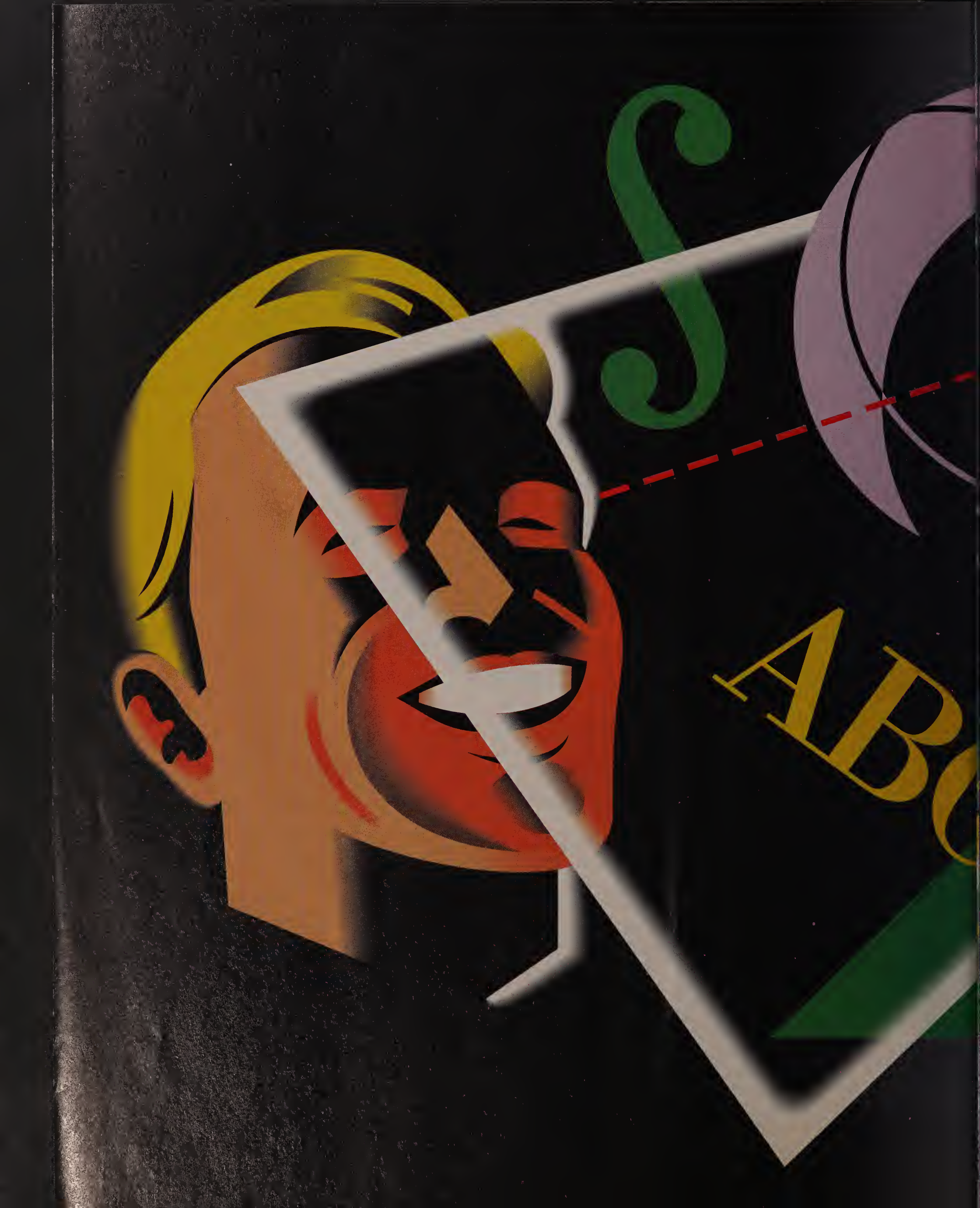
Just for the record, all the ads in this series feature real live MacConnection customers and the real live letters they wrote us. Really!


ABC

Page-Layout Contenders

Which is the champ —PageMaker, QuarkXpress, or ReadySetGo?

by Jim Heid

For Mac users thinking of taking the electronic publishing plunge, the hype, horror stories, and accolades heaped on each of the big three page-layout programs—Aldus's PageMaker 3.01, Quark's QuarkXpress 2.0, and Letraset's ReadySetGo 4.5—are enough to send the poor souls scurrying back to their mat knives and waxers. This is a shame, because desktop publishing can more than repay the initial investment of time and money. But which page-layout program to buy?

In order to explore and rank the three programs' various features, I decided to use each one to create a mock newsletter for my hypothetical Forest Society (I worked up an annual report for this fictitious group in "The Great Write-Off," *Macworld,* November 1988). I chose a newsletter because it is a common desktop publication and because its attributes are shared by many other documents. The *Forest Report* requires several layouts and includes splashes of *spot color.* It also contains images created with a gray-scale scanner, and a fancy banner from Illustrator 88.

At first glance, it seems that any of the three programs could meet my needs. They all have similar features and operating styles, and each is a veteran of the desktop publishing world. Still, every contest has a winner and a loser. To determine my winner, I divided the competition into seven events, each of which tests different aspects of the programs. The event scorecards list program specifications and features for each category.

EVENT #1: **BASIC LAYOUT FEATURES**
TESTS: *Specifying publication length and characteristics; using layout tools and navigation aids.*

All three programs mimic traditional page-layout techniques. Using on-screen rulers and T-square equivalents for precise positioning, you place text and graphics on a layout surface much as a pasteup artist would—but without the bother of rubber cement fumes and dull razor blades.

RON CHAN

In each layout program, the first step involves specifying the page size and margins for the publication. All three let you change a document's margins at any time, but only PageMaker and ReadySetGo enable you to change the page size. To get a new page size with QuarkXpress, I had to create a new document and import the contents of the first document via the Clipboard.

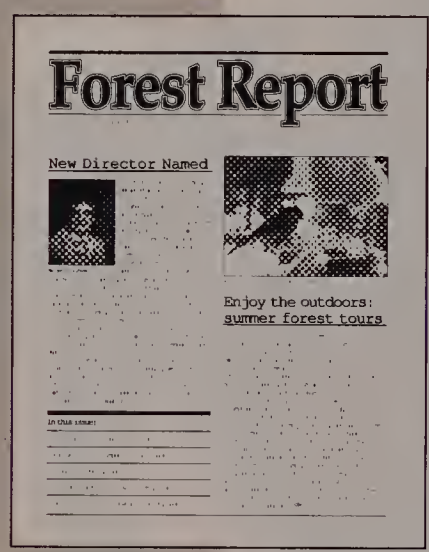
To accommodate elements that repeat on each page (for example, page numbers, issue dates, rules), PageMaker and ReadySetGo provide *master pages* that are like transparent overlays. For title pages and other unique pages, you can hide the master-page items.

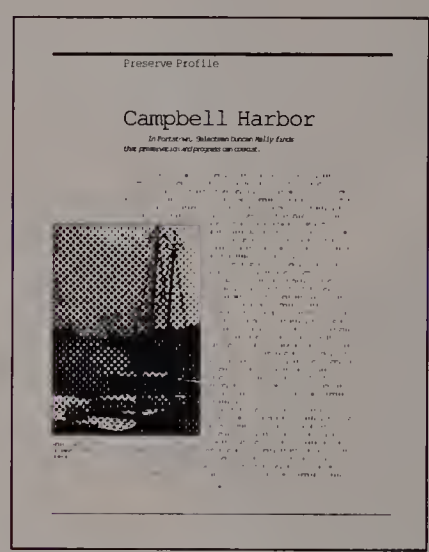
Xpress's *default page* holds repeating elements, but it doesn't work like an overlay. Xpress copies the default items to each page of the document. On the plus side, you can easily change default elements, such as chapter headings, on individual pages. On the downside, to change repeating elements for the whole document—as I did when experimenting with different layouts—means enduring a convoluted (and obtusely documented) insert-and-delete-page routine.

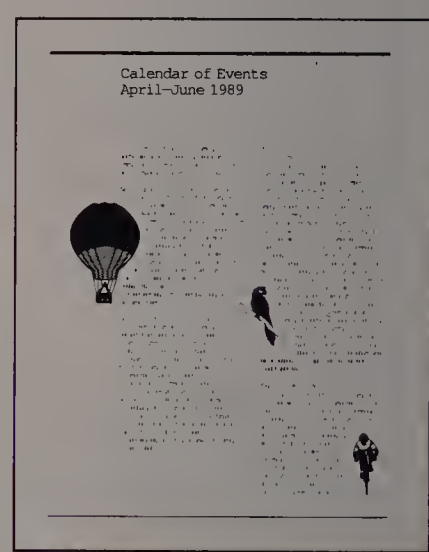
Positioning and Navigating.

To place text or graphics with ReadySetGo or Xpress, you first draw a *text box* or a *graphics box*—a container that holds text or images—and then choose the file you want to place. PageMaker doesn't require text or graphics boxes. You simply select the file containing the desired text or graphic, and the pointer changes shape to indicate that it's "loaded." You then click where you want the file to appear.

This point-and-click pasteup style is excellent for experimenting with different layouts, but the box-oriented style in Xpress and ReadySetGo is ideal for my newsletter, since each issue shares a similar layout. Creating a *template* that can handle subsequent issues requires a bit more setup time, but producing future issues is a cinch. I just pour the elements into each box and fine-tune as necessary. You can also create templates in PageMaker, but you must include dummy text and graphics to act as placeholders for the document's components.







Pictured here are three sample pages from the Forest Report *newsletter.*

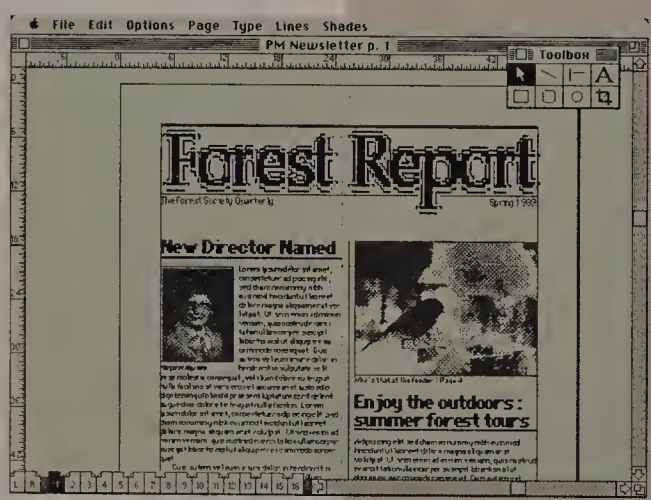
Xpress and ReadySetGo offer dialog boxes that let you specify a text's or graphic element's position to within 1/10,000 inch—that's more precision than a Linotronic, Compugraphic, or Varityper Imagesetter provides. For mouse-oriented layout, however, PageMaker leads. Although all three programs provide *snap-to guides* which act as magnets that attract elements dragged near them, the guides in ReadySetGo and Xpress are not as versatile as the ones in PageMaker. PageMaker can display column guides and snap-to guides simultaneously (see "Rulers and Guides"). And with it, you can temporarily place items outside a page's boundaries, just as a paste-up artist might tack something to a layout table for later use.

When dragging text or graphic elements, Xpress and ReadySetGo show only a blank rectangular bounding box, which makes aligning and positioning items more difficult since you must release the mouse button and wait for the program to redraw the element before you can check its position. PageMaker shows the text or graphic element as you drag it.

PageMaker also excels at creating multicolumn pages and varying column widths from page to page. Xpress and ReadySetGo let you change the width of column guides at any time, but each change applies to every page in the document. (Although the guides change, existing text isn't reformatted.) In PageMaker, unless you create the column guides on the master pages, column widths are independent for every page.

All three programs offer a variety of magnification scales. To speed screen displays in reduced scales, all three programs *greek* lines of text—display gray horizontal bars instead of tiny, illegible characters. All three also let you specify the type size below which text is to be greeked.

While PageMaker and ReadySetGo provide page icons for accessing specific pages in a publication, Xpress requires that you scroll through a document as you would with a word processor. PageMaker and ReadySetGo also have a *grabber* tool for scrolling a page in any direction; Xpress makes you alternate between the horizontal and vertical scroll bars. ReadySetGo's handy thumbnail window, new in version 4.5, shows reduced versions of numerous pages at once (see "Thumb(nail)s Up").



Rulers and Guides

All three programs provide on-screen rulers and positioning aids, but PageMaker's are the most complete and flexible. Visible here are vertical column guides *and several horizontal* ruler guides. *PageMaker's page icons, used for accessing other pages, appear in the lower-left corner.*

Event #1: Basic Layout Features

	PageMaker 3.01	QuarkXpress 2.0	ReadySetGo 4.5
Maximum document length (in pages)	128	limited by memory	limited by memory
Maximum number of open documents	1	limited by memory	limited by memory
Supports custom page sizes	•	•	•
Maximum page size (in inches)	17 by 22	48 by 48	99 by 99
Existing document's page size can be changed	•		•
Master pages for repetitive elements	•	•	•
Existing layout reflects changes to master page	•		•
On-screen rulers	•	•	•
Measuring systems supported[1]	A, C, D, E, F	A, B, C, D, E	A, B, C, D
Snap-to-guides	•	•	•
Adjustable snap sensitivity			•
Row-and-column layout grids			•
Multiple column grids	•	•	•
Independent column guides on each page	optional		
Displays grids and guides simultaneously	•	•	
Guide positions can be locked	•		•
Displays pointer position relative to zero		optional	
Markers in rulers to indicate pointer position	•	not always[2]	•
Vertical ruler can use different measuring system	•		
Type of tool palette	floating window	fixed palette	fixed palette
Icons for accessing other pages	•		•
Scroll bars for accessing other pages		•	
Thumbnail window for accessing other pages			•
Viewing scales (percentage of actual size)	50, 70, 100, 200, 400	50, 75, 100, 200	50, 75, 100, 200
Adjustable text-greeking threshold	•	•	•
Shows elements being dragged	•[3]		

[1] A = picas; B = points; C = inches; D = metric; E = ciceros; F = tenths of an inch.

[2] QuarkXpress displays moving ruler markers only when the mouse button is down.

[3] If you begin dragging immediately after selection, only bounding box is shown.

EVENT #2: **BASIC TEXT HANDLING** TESTS: *Importing word processor files; flowing text across columns and pages; automating repetitive formatting.*

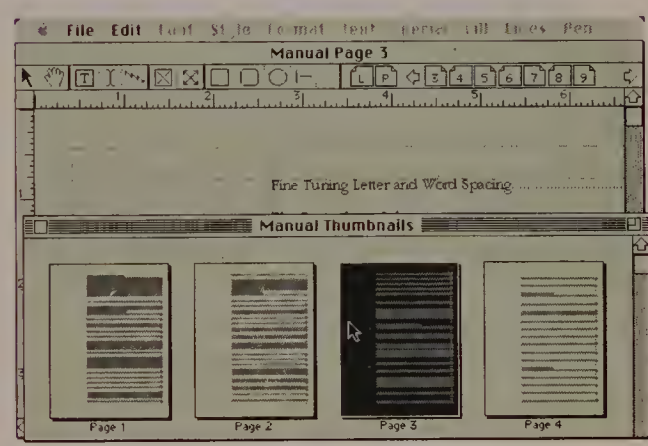
All three programs let you type and edit text directly on a layout, and ReadySetGo and QuarkXpress contain spelling checkers. (ReadySetGo's is better; Xpress's provides a useful word count but flags many plurals as misspelled.) ReadySetGo also offers a search-and-replace command and a glossary feature.

Despite these niceties, I still prefer to use a word processor for original drafts and for specifying font and type size. All three page-layout programs can import formatted documents from several Mac word processors; PageMaker also reads documents from the IBM PC version of PageMaker as well as from many other PC programs.

Alas, ReadySetGo has trouble importing Microsoft Word documents. ReadySetGo doesn't filter out text formatted in Word's hidden-text style, and it ignores such rudimentary formatting information as hanging indents, tab leader characters, and paragraph spacing. Letraset says it's aware of some Word import problems and plans to fix them in a maintenance upgrade.

When importing a file with PageMaker or ReadySetGo, you can specify that the program convert the Mac's typewriter-style quotes into true opening and closing quotes, and convert double hyphens into em dashes. This is a must-have feature for improving a document's typographic quality. Xpress needs it.

All three programs let you create *style sheets* for automating repetitive formatting chores, such as the Calendar of Events page in my newsletter, in which each listing begins with a headline in Franklin Gothic Heavy and ends with price information in Palatino Italic. Xpress and PageMaker can also import style sheet formats from Microsoft Word documents. And ReadySetGo and PageMaker can apply style sheet formats according to typed *style tags*—style sheet names enclosed within angle brackets (as in <body text>)—that you add to text files before importing.



Thumb(nail)s Up
Only ReadySetGo offers a thumbnail window, which shows reduced versions of numerous pages at once. These let you quickly move to any page, print thumbnail pages, change the order of pages, or copy an entire page to the Clipboard. ReadySetGo's page icons are visible at the top of the document window.

Linking and Formatting

To flow lengthy passages into discontiguous text boxes, *linking* features are required. With ReadySetGo and Xpress, you use a linking tool to specify the relationship between the text boxes you've drawn. The steps are nearly identical in both programs, but Xpress provides more feedback by drawing arrows between linked text boxes (see "Text Linking"). Xpress can also automatically generate page numbers for jump lines (for example, *continued on page 4*)—which is very useful in periodical publishing.

PageMaker creates and maintains links automatically as you place an article. While this approach requires less initial effort, it's not well suited to periodicals with repetitive formats. For example, the lead

feature in my newsletter always starts on page 1 and continues on page 4. With Xpress and ReadySetGo, I can create a template containing linked but empty text boxes on those pages. PageMaker, on the other hand, requires that templates contain dummy text to act as placeholders.

For specifying fonts, sizes, and styles, all three programs provide Font and Style menus or submenus, as well as dialog boxes for choosing all aspects of character formatting at once. Superscripts and subscripts are missing from ReadySetGo's type formats, but you can create them by using a smaller type size and then moving the characters above or below the baseline with the Shift Up or Shift Down commands.

Speaking of baselines, in all three programs you can specify leading in explicit, baseline-to-baseline terms (the way designers and typographers do), or you can use the current font's built-in autoleading value. In Xpress the leading values you choose apply to the entire paragraph containing the cursor. With PageMaker and ReadySetGo, however, you can specify different leading for individual lines within a paragraph.

This Russian version of Parker Brothers' game, Monopoly, was laid out using ReadySetGo.

EVENT #3: **ADVANCED TEXT HANDLING**
TESTS: *Automatic page insertion and text flow; vertical and horizontal justification; kerning and tracking; hyphenation; creating special effects with type.*

All three programs provide an *autoflow* feature that eliminates the need to turn pages in order to place leftover text. QuarkXpress and PageMaker automatically add new pages to the layout, flow the text into columns on those pages, and link the text to the previous page. With ReadySetGo, you must first insert a number of pages and specify that they be linked. If the text doesn't fit, you must add more pages manually. PageMaker's autoflow feature fills every column on each page. Should your layout require that the continuations of a story appear in the second column of every page, for instance, you would have to use the more cumbersome semiautomatic-text-flow mode.

Xpress wins the autoflow competition because it lets you specify exactly where you want text to appear on each page, by creating and linking text boxes on the default pages. ReadySetGo offers the same option, but doesn't insert pages automatically.

Justifying Your Actions

Traditional layouts generally employ *vertical justification:* columns align evenly across the top and bottom. ReadySetGo can vertically justify columns by *feathering*—adding extra space between every line—or by adding extra space between paragraphs.

As for horizontal justification, only PageMaker and Xpress allow you to specify that extra space be added between words, letters, or both, as well as to set maximum values for interword and interletter spacing. ReadySetGo lacks such features, but its Letterspace and Word Spacing commands do let you manually tweak word and letter spacing for a selected range of text. Letraset says improved word- and letter-spacing control is planned for a future version.

Unfortunately, Xpress contains a bug that causes occasional spacing problems in narrow columns of pseudo-italic (slanted font characters) text. Quark plans to fix the bug in a future release. Until then, use true italic fonts to avoid the problem.

All three programs feature automatic hyphenation. Xpress and ReadySetGo combine grammatical hyphenation rules with *exception dictionaries,* which hold words that bend grammatical rules or are hyphenated differently depending on their meaning, for example, *proj•ect* (a noun) and *pro•ject* (a verb). PageMaker bases all hyphenation decisions on a 110,000-word dictionary, which you can supplement with exceptions. In theory, PageMaker's reliance on a dictionary should make its hyphenation more accurate.

Event #2: Basic Text Handling

	PageMaker 3.01	QuarkXpress 2.0	ReadySetGo 4.5
Word processor formats supported[1]	A, B, C, D, E, F	A, B, C, D, E	A, B, C, D, E
Reads word processor file as text-only	optional		
Interprets Word style sheets	•	•	
On-screen floating style-sheet window	optional		
Ignores Word hidden text	•	•	
Automatic *continued on* page references		optional	
Displays codes for invisible characters		optional	
Interprets typed style tags	•		•
Allows creation of new style sheets	•	•	•
Translates typographic quotes and em dashes	optional		optional
Glossary feature			•
Built-in spelling checker		•	•
Dialog box for precise text positioning		•	•
Type styles supported[2]	BF, I, U, O, S, SC, X, R	BF, I, U, O, S, SC, SS, SB, X	BF, I, U, O, S, C, EX, X
Maximum type size (in points)	127	500	327
Case-conversion commands[3]	AC, SC	AC, SC, IC	AC, AL, S, IC
Keyboard shortcuts for editing and formatting	•	•	•

[1] A = text-only; B = Word 3.0; C = MacWrite; D = WriteNow; E = Microsoft Works; F = many IBM PC word processors.

[2] BF = bold; I = italic; U = underline; S = shadow; O = outline; C = condensed; EX = extended; X = overstrike; SS = superscript; SB = subscript; SC = derived small caps; R = reverse.

[3] AC = all caps; SC = derived small caps, IC = initial caps; AL = all lowercase; S = sentence caps.

Kerning and Type Effects

Each program provides automatic and manual *kerning*—the ability to add or remove space between characters that don't sit well together, as in the pairs *To* and *Ye*. The automatic kerning in PageMaker and Xpress relies on the pair-kerning data built into most fonts. Because automatic kerning slows the program slightly and is of less value with small type sizes, PageMaker lets you specify an autokern threshold—a typesize below which PageMaker doesn't automatically kern.

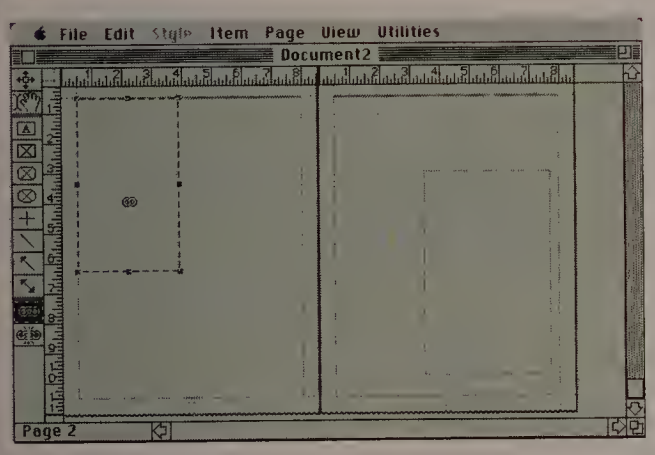
ReadySetGo's automatic kerning is better described as semiautomatic. You must first select the text to be kerned, press the Option key, and choose Auto Kern. Failure to follow these steps for all similar text in a publication means inconsistent kerning, which is worse than no kerning at all.

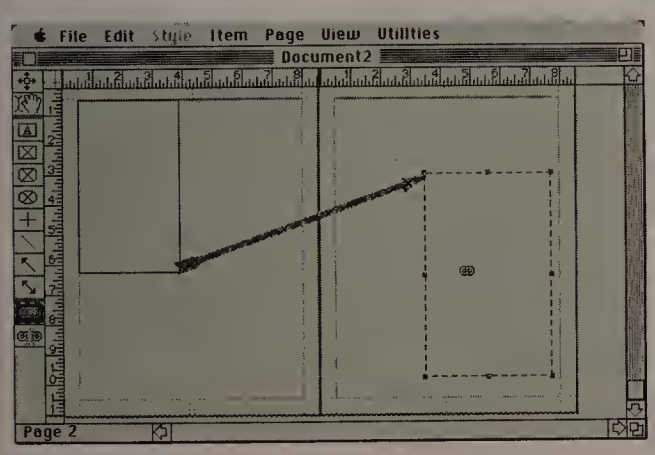
To get that hand-set look with headlines, there's no substitute for manual kerning. I prefer the manual kerning features in ReadySetGo and Xpress to those in PageMaker. Unlike PageMaker, both programs provide dialog boxes as well as keyboard shortcuts for specifying the precise amount of reduction.

Event #3: Advanced Text Handling

	PageMaker 3.01	QuarkXpress 2.0	ReadySetGo 4.5
Adds pages as needed for lengthy imports	optional	optional	
Autoflows text into selective columns		•	•
Automatic vertical column justification			optional
Automatic kerning	•	•	semiautomatic
Adjustable auto-kern threshold	•	•	•
Adjustable auto-kern scaling factor			•
Kerning precision (in ems)	0.042	0.005	0.001
Adjustable word spacing for justified text	•	•	•
Automatic hyphenation method	dictionary	grammatical rules	grammatical rules
Exception dictionary	•	•	•
Prompted hyphenation mode	•		
Hyphenates selected word or range of words	•		
Hyphenates capitalized words	•	optional	optional
Adjustable number of consecutive hyphenations		•	•
Adjustable word-length hyphenation threshold		•	•
Adjustable hyphenation zone	•		
Prevents hyphenation of last word in paragraph			optional
Word processor export formats supported[1]	A, B, D	A, B, C, D	A
Exports Word style sheets	•	•	
Exports style tags	optional		optional
Searches and replaces text			•
Searches and replaces font, size, and style		•	•
Text-stretching and condensing command		•	•
Text-rotation commands			
Text-shading commands		•	

[1] A = text-only; B = Word 3.0; C = MacWrite; D = WriteNow.





Text Linking

In ReadySetGo and QuarkXpress, you use a linking tool to define the relationship between blocks of consecutive text. In Xpress, shown here, text boxes on two pages are being linked by clicking the linking tool in the first text box (top), then in the second box (bottom). Xpress draws an arrow to confirm that the boxes are linked.

Xpress and ReadySetGo both claim to provide *tracking* features—fine-tuning the space between every character in a document—but they don't. On a typesetting machine, tracking increases the spacing between small characters slightly, leaves the spacing of most body-type sizes unchanged, and tightens up large type. Xpress and ReadySetGo don't work this way. They simply tighten or loosen spacing across a range of text. This can be useful, but it isn't tracking.

All in all, none of these programs make it particularly easy to produce attractive display type. It's a trial-and-error process of test prints and tweaking. If you work with display sizes extensively, consider Letraset's LetraStudio.

FreeHand and Illustrator don't make creating precisely kerned headlines any easier. LetraStudio, on the other hand, uses its own top-quality screen fonts and lets you click and drag individual characters.

For creating special typographic effects, none of the three programs I tested can replace a specialized tool such as LetraStudio, Illustrator, or FreeHand. Xpress, however, does let you shade text in 1 percent increments, condense text to as little as 25 percent of its original width, and expand it as much as 400 percent. ReadySetGo's Expand and Condense commands alter the width of text, but you can't specify the percentage of alteration.

EVENT #4: **GRAPHICS HANDLING**
TESTS: *Importing graphics; drawing boxes and rules; altering imported graphics.*

In my newsletter, the banner is an encapsulated PostScript (EPS) file created in Adobe Illustrator. The newsletter also in-

cludes some scanned images that I touched up using Letraset's ImageStudio, as well as some PostScript clip art from T/Maker's EPS Illustrations series.

All three page-layout programs can accommodate the popular Mac graphics file formats, although PageMaker doesn't support ImageStudio's raster image file format (RIFF). ImageStudio files must be imported in tagged-image file format (TIFF), which is too bad, since TIFF files take up far more disk space. (For an introduction to gray-scale scanning and image formats, see "Getting Started with Scanners," *Macworld,* November 1988, and "A Halftone Handbook," *Macworld,* October 1988.)

To import graphics in ReadySetGo and QuarkXpress, you draw a graphics box to hold the image, and then choose the Get Picture command. In PageMaker, you choose Place, select the file, and click the loaded mouse pointer where you'd like the image to appear on the page. I prefer PageMaker's approach. Unlike text, a graphic on one page is never linked to a graphic on another, so there's no real benefit to drawing boxes that hold images.

Each of the three programs allows you to crop and resize imported graphics, although with ReadySetGo, you can't resize a graphic using the mouse. Instead, you type values in the Specifications dialog box. I like being able to specify precise enlargement or reduction percentages (I wish PageMaker offered that option), but fast, click-and-drag resizing is also a must.

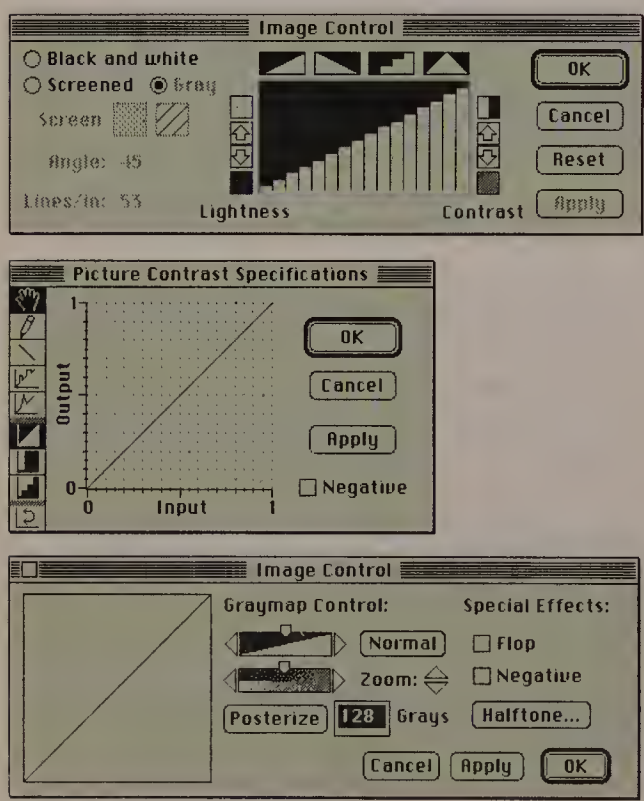
In my newsletter, I wanted a hairline-width frame to surround each scanned image. With PageMaker and ReadySetGo, you must draw such a box yourself using the programs' box-drawing tool. Positioning and sizing the box to surround the image exactly is difficult, even in a magnified view. With Xpress, you can simply choose the Frame command and specify the width of the frame's lines, and Xpress creates the box for you. And if you move the graphic, the frame moves with it. Xpress also includes a program that lets you create custom frames and borders.

Event #4: Graphics Handling

	PageMaker 3.01	QuarkXpress 2.0	ReadySetGo 4.5
Built-in drawing tools[1]	A, B, C, D, E	A, B, C, D, E, F	A, B, C, D, E
Line-width increments (in points)	.25, .5, 1, 2, 4, 6, 8, 12	.25, 1, 2, 4, 6, 8, 12	.125, .25, .5, .75, 1, 2, 4, 6, 8
Custom line widths		●	
Dashed and double rules	●	●	●
Graphics file formats supported[2]	G, I, J, K	G, H, I, J, K	G, H, I, J, K
Ease of placing graphics	very easy	very easy	easy
Fast gray-scale display option			●
Gray-scale modification features	●	●	●
Custom halftone screens	●	●	●
Ease of modifying gray scales	very easy	very easy	very easy, but slow
Ease of cropping graphics	very easy	easy	easy
Ease of sizing graphics	very easy	easy	difficult
Ease of creating rectangular text wraps	very easy	very easy	very easy
Ease of creating irregular text wraps	can be difficult	very easy	very easy
Dialog box for precise graphics positioning		●	●
Dialog box for precise graphics scaling		●	●
Allows graphics sizing and scaling with mouse	●	●	
Places graphics from Scrapbook file	●		

[1] A = horizontal/vertical line (rule); B = diagonal rule; C = box; D = round-cornered box; E = circle; F = arrow.

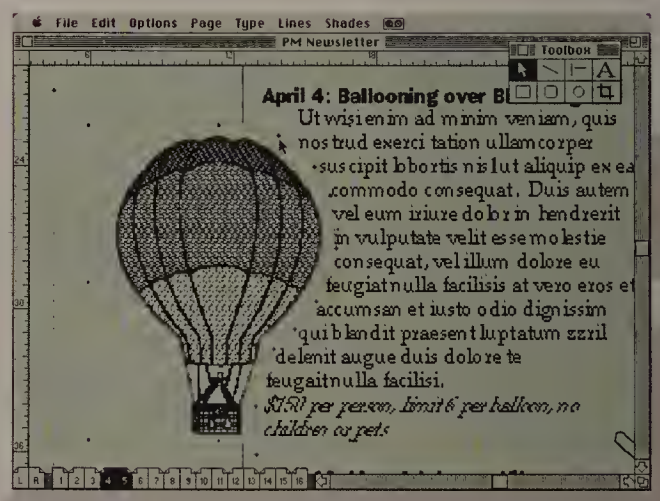
[2] G = MacPaint; H = RIFF; I = TIFF; J = PICT; K = EPS.



Altering Gray Scales
All three programs let you alter the brightness and contrast of gray-scale images and specify custom halftone screens. The gray-scale editing windows are similar in each program: at the top is PageMaker's; in the middle is QuarkXpress's; and at the bottom, ReadySetGo's.

Managing Scanned Images

I use scanned images often, so the speed with which a publishing program imports large image files is important to me. Of the three programs I looked at, Xpress imports scanned images the fastest. On a 2-megabyte Mac II, Xpress took 8 seconds to import a 406K TIFF file. PageMaker took 15 seconds, and ReadySetGo, a painfully slow 32 seconds. Worse, ReadySetGo interpreted the file's image-size information incorrectly. The original scanned image measured 2 by 2½ inches. When ReadySetGo imported it, its size doubled to 4 by 5 inches.



PageMaker Runaround
In QuarkXpress and ReadySetGo, wrapping text around an irregularly shaped graphic is a one-click job. In PageMaker (shown here), you must laboriously adjust the control points of a graphic boundary. *This requires more effort, but you have far more control over the runaround's appearance.*

All three programs let you exploit the versatility of gray-scale images by altering their brightness and contrast, and specifying custom halftone screens (see "Altering Gray Scales"). The gray-map editing windows are similar in all three, but ReadySetGo users will wait longer to use theirs. On a Mac II, Xpress and PageMaker redrew an altered image in about 1 second; ReadySetGo took 11 seconds.

Because TIFF and RIFF files tend to be large, none of the layout programs actually save the image data in the document file itself. Instead, each program imports and displays a low-resolution version of the image, and then creates an internal link between the low-res version and the original image file. Only at printing time does the program use all the data in the original image file. Xpress uses this linked approach for EPS files, as well; and PageMaker uses linking with any graphic larger than 64K.

Linking has important ramifications that you must remember whenever you reorganize a hard disk, rename a file, or copy a publication to a different disk. When printing, each program begins looking for the appropriate RIFF or TIFF file in its original folder. If the image file isn't there, PageMaker presents a dialog box letting you locate it or ignore the problem. Choosing the latter option results in low-resolution results at printing time.

If Xpress doesn't find the image file in its original folder or in the folder containing the publication file itself, the program simply beeps and prints the low-resolution file. ReadySetGo helpfully searches every folder on the disk, but doesn't print a low-res version of the file. Thus, if the program doesn't find the original, you must import it—and probably resize and position it—all over again.

In all, PageMaker handles this thorny file-management issue best. I wish that it looked around before asking for help, but at least it asks.

Event #5: Color Capabilities

	PageMaker 3.01	QuarkXpress 2.0	ReadySetGo 4.5
Supports spot color for graphic elements	•	•	•
Supports spot color for text	•	•	•
Text style-sheets support color	•	•	•
On-screen floating color palette window	optional		
Color models supported[1]	HSB, RGB, CMYK	HSB, RGB, P, CMYK	HSB, RGB, P
Allows import/export of color palettes	•	•	•
Creates spot color overlays at printing time	•	•	•
Imports color TIFF files		•	•
Displays color TIFF files in color	n/a	•	•
Color separates TIFF files			
Imports color EPS files	•	•	•
Displays color EPS files in color			
Color separates EPS files		•	

[1] HSB = hue, saturation, brightness; RGB = red, green, blue; P = Pantone; CYMK = cyan, yellow, magenta, black.

A Wrap Session

On the first page of my newsletter the text wraps around a photo, and in the Calendar of Events section the text hugs the contours of some irregularly shaped graphics. With all three programs, creating rectangular *text wraps,* also called *runarounds,* is as easy as choosing a command and specifying how much space you want between the graphic and the text.

Irregular text wraps follow a similar process with ReadySetGo and Xpress, but in PageMaker, you move control points on a *graphic boundary*—a fence that PageMaker erects around an image to keep surrounding text at bay (see "PageMaker Runaround"). The process requires more work, but it gives you far more control over the runaround than do Xpress and ReadySetGo. (Tip: To prevent PageMaker from reformatting text after every control point adjustment, hold down the space bar while adjusting the graphic boundary.)

The artwork for the Scrooged *sound track cover was designed using PageMaker.*

EVENT #5: **COLOR CAPABILITIES**
TESTS: *Specifying spot color; importing color images; creating color separations.*

Color adds a great deal to a publication—and to the printing bill. Products for scanning and reproducing color photos and images electronically are too new and too expensive to enable many desktop publishers to commit to more than a splash of spot color.

All three programs support spot color for text and graphic elements. QuarkXpress and PageMaker let you specify color with any of three *color models*—red-green-blue (RGB), hue-saturation-brightness (HSB), and cyan-magenta-yellow-black (CMYK). Xpress and ReadySetGo also let you specify colors using the industry-standard Pantone Matching System (PMS), although what you see on screen only approximates true PMS colors. Alas, ReadySetGo does not support the CMYK support model, the most widely used model for process color separation. CMYK support is planned for a future release, according to Letraset. (For details on color models and color-separation issues, see "Selecting a Color Separator," *Macworld,* March 1989.)

Each program can also import color images created with Illustrator 88, al-

though none display the images in color. Xpress and ReadySetGo can import color bitmapped images saved in TIFF-24 or PICT2 formats. (PageMaker imports the latter, but not the former.) With Xpress's Image Control command, you can perform color correction on an imported image. But Xpress can't color-separate a bitmapped image at printing time, so that feature is of limited value. At present, bitmapped color separation remains the province of color graphics programs such as LaserPaint and Avalon's PhotoMac (see "Color Separation Explained," in the February 1989 issue).

Event #6: Printing

	PageMaker 3.01	QuarkXpress 2.0	ReadySetGo 4.5
Uses custom PostScript driver	optional		
Prints document to disk as PostScript file	optional	[1]	[1]
Prints document to disk as EPS file	optional		
Prints registration marks	optional	optional	optional
Prints crop marks	optional	optional	optional
Prints color titles	optional	optional	optional
Selectively prints odd or even pages		•	
Prints reduced thumbnail pages	•		•
Automatic tiling	•	•	•
Manual tiling	•	•	
Bitmap smoothing on non-Apple printers	optional	optional	
Supports GCC Personal LaserPrinter	•	•	•
Supports Apple LaserWriter IISC	•	•	•
Creates halftones with non-PostScript printers	•	•[2]	PLP only
Supports background printing under MultiFinder	optional[3]	•	•
Compatible with most print spoolers	•[3]	•	•

[1] Mac-standard ⌘-F sequence works, but is undocumented and not as flexible as PageMaker's print-to-disk options.

[2] Versions 2.0a and later only.

[3] When used with Apple's PostScript driver only.

EVENT #6: **PRINTING**
TESTS: *PostScript and QuickDraw printer compatibility; printing oversized pages; printing documents to disk files.*

When it comes to printing, PageMaker earns first place because of its custom PostScript printer driver, which bypasses Apple's standard PostScript driver. The Aldus print driver uses Adobe Printer Description (APD) files, which contain specific information about the features (supported page sizes, fonts, number of paper trays, and so forth) of many popular PostScript printers. APD files also describe a printer's resolution and print engine, thus allowing PageMaker to optimize the appearance of scanned images as well as shaded screens and rules. With the standard Apple PostScript driver, hairline rules and shaded areas print lighter on a 300-dots-per-inch (dpi) printer than they do on a high-resolution imagesetter because the latter provides more dots per inch. APD files allow PageMaker to compensate for this problem.

In addition, the Aldus PostScript driver contains built-in smoothing routines that improve the appearance of bitmapped graphics by filling in their jagged edges. Apple's PostScript driver provides a smoothing option, but it works only with Apple's PostScript printers.

There are drawbacks to PageMaker's custom driver. It doesn't allow for background printing under MultiFinder and it isn't compatible with some print spoolers. Although PageMaker is compatible with Symantec's LaserSpeed, SuperMac's SuperLaserSpool, and Apple's LaserShare, if compatibility with a different spooler is important, you can specify that PageMaker use Apple's PostScript driver.

QuarkXpress doesn't use APD files or a PostScript driver, but it does provide direct support for several non-Apple PostScript printers, including Linotronic imagesetters, Dataproducts' LZR-2665, QMS's ColorScript, Compugraphic's P400PS, and Varityper's VT600. As with PageMaker, choosing one of these printers causes Xpress to update the dialog box to reflect the printer's unique features. And like PageMaker, Xpress compensates for differences in output resolution when printing hairline rules and boxes. Xpress also contains its own bitmap smoothing routines.

ReadySetGo uses Apple's PostScript driver but provides no support for unique printer features, no compensation for different output resolutions, and no special smoothing routines.

Special Printing Features

All three programs provide automatic *tiling,* a feature that lets you print pages larger than a printer's maximum paper size. Automatic tiling breaks large pages into smaller overlapping tiles. Each program allows you to specify the amount of overlap.

To avoid creating a tile that cuts through a headline or graphic, Xpress and PageMaker let you manually control tile *breaks.* ReadySetGo, which supports the largest page size of the three, surprisingly lacks manual tiling.

Although many typesetting services prefer to work with original publication files, some accept *print files* created by intercepting PostScript code destined for a printer and saving it on disk. PageMaker's custom PostScript driver provides some sophisticated print-to-disk options that streamline the process of creating print files. You can specify that PageMaker include downloadable fonts in the print file, and you can create an EPS file of the document. I used the latter feature to reproduce the miniature of page 1 of my newsletter on page 2.

Xpress and ReadySetGo have no special print-to-disk features, but you can create a print file with them—and indeed, with any Mac application—by pressing ⌘-F immediately after confirming the Print dialog box. The Xpress and ReadySetGo manuals don't mention this option.

EVENT #7: **PROGRAM DESIGN AND DOCUMENTATION**
TESTS: *Quality of documentation; ease of learning; ease of use; reliability; hardware requirements; performance.*

PageMaker's three volumes of documentation—a hands-on tutorial, a thorough user's guide, and a detailed reference manual—set the standard for page-layout programs. And all this is augmented by a unique, hypertext-style, online help system based on OWL International's Guide.

ReadySetGo's documentation, although clearly written and well-organized, lacks detail on topics such as the importing of files, printing to high-resolution imagesetters, and the use of service bureaus. Worse, one must jump between the 4.0 user's guide and the 4.5 update guide. And ReadySetGo has no online help.

Xpress finishes a distant third in the documentation derby. Its manuals are skimpy, poorly organized, and poorly indexed. The program offers detailed online help, but it's organized according to menu commands, not tasks.

The premiere issue of Smart *magazine was laid out using QuarkXpress.*

Event #7: Program Design and Documentation

	PageMaker 3.01	QuarkXpress 2.0	ReadySetGo 4.5
Quality of documentation	excellent	poor	very good
Quality of online help	excellent	good	n/a
Ease of learning	very easy	easy	easy
Ease of use	easy	easy	easy
Keyboard shortcuts	fair	very good	very good
Reliability	excellent	very good	very good
Minimum disk space requirement	1.1MB	950K	727K
Maximum disk space requirement	3.3MB	1.3MB	727K
Suggested memory size in MultiFinder	700K	992K	1024K
Overall performance on Mac II	very good	excellent	excellent
Overall performance on Mac SE	good	good	very good
Online help	•	•	
Rating of documentation	excellent	fair	very good

All three programs are easy to learn, but PageMaker has the edge. By enabling you to place elements on the pasteboard or directly on the page, PageMaker is more faithful to the electronic layout-table metaphor. Also, more books and training materials are available for PageMaker than for the other two programs. ReadySetGo's ease of learning is hampered by the minimal feedback its text-linking tool provides. Xpress is limited by the program's unusual default page.

Once you've mastered the basics, which program is easiest to use? That's a tough call. PageMaker has the most complete scrolling and navigation aids but provides few keyboard shortcuts. ReadySetGo offers more keyboard shortcuts and has good scrolling and navigation aids, but its autoflow feature doesn't insert pages automatically; and ReadySetGo doesn't provide enough feedback when you're linking text boxes. Xpress offers excellent keyboard shortcuts and its text boxes are ideal building blocks for document templates, but scrolling and navigating are cumbersome.

As for reliability, all three programs behaved well for me, although each did crash at least once during testing. But PageMaker gets the edge here because of the unique way it saves documents. Each time you move to a different page, PageMaker saves the page you just worked on. If a crash occurs, you lose only the changes you made on the current page.

If there's a price to pay for PageMaker's elegance, it's in performance. ReadySetGo's slow-motion graphics handling aside, PageMaker is generally the slowest of the trio, although not unacceptably so. ReadySetGo has the most responsive feel. Xpress is fast, too, but its limited scrolling and navigation aids make it feel much less so.

And the Winner Is . . .

Despite its slower performance, lack of support for RIFF files, and inability to open more than one document at a time, PageMaker wins the contest hands down. As the points covered in this article and the accompanying Event Tables illustrate, PageMaker does many things right that the others do wrong. If you work in an office that uses IBM PCs, there's another bonus to using PageMaker: it can share publication files with its IBM PC cousin, which works nearly identically.

It's true that QuarkXpress allows more typographic effects and, like ReadySetGo, simplifies the creation of templates for periodicals. And Letraset promises that a future version of ReadySetGo will be a much stronger contender. The fact remains, though, that for now, unless you can afford to invest in more than one page-layout program, PageMaker is the program of choice. □

See *Where to Buy* for contact information.

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Options for moving MS-DOS files into a Mac without losing your data or your mind

by Charles Seiter

A File-Transfer Primer

A friend has written a three-page résumé on an IBM PC. He would like to transfer it to your Mac so that you can print out several formatted copies on a LaserWriter.

You work for a company that has just bought Macintoshes. The company has five years of financial records in Lotus's 1-2-3 files on 5¼-inch PC floppies, and you need to use this data in Excel.

Your office is setting up a local area network (LAN) to link Macintoshes and PCs. Which applications will work best together?

In all these cases, you need to accomplish a very specific task: getting files from MS-DOS applications into a format that Macintosh applications can use. And you want to perform these file transfers in the simplest and least expensive way. The good news is that transferring files from an IBM PC to a Mac is easy—much easier than transferring complex Mac files into the simpler, character-based world of the stock PC.

File Translation Programs

If you've never before used a communications program—to send files to another computer or to a bulletin board such as CompuServe—you should start your foray into file transfers with a file-transfer system that has had the communications hassles ironed out. My advice is simple: get a copy of MacLink Plus, LapLink Mac, or xFer. These specialized communications packages come with guaranteed-to-work cables, for hooking up the Mac to the PC, and disks containing the transfer application, one for the Mac and one for the PC.

For example, after you start up DataViz's MacLink Plus, the Mac displays a series of menus and dialog boxes (the PC program just responds passively). You tell the program which translators to invoke, click on the Connect button, and view the Mac files and PC files in two lists (see "MacLinking"). For example, you can set the

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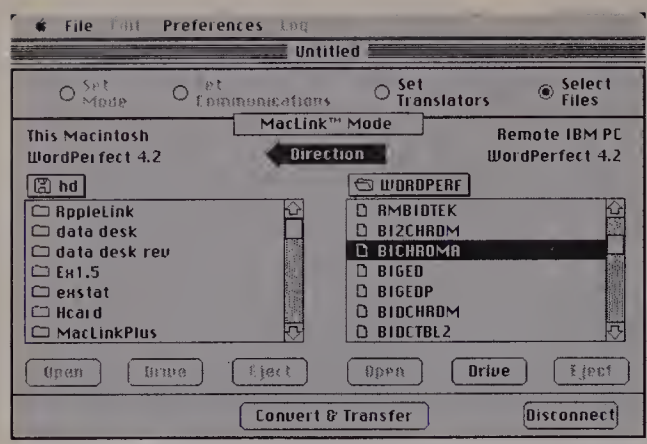
PHOTOGRAPHS BY FRED STIMSON

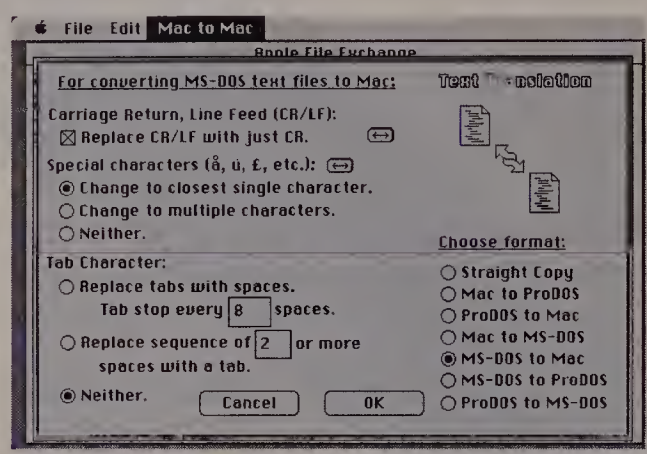


MacLinking
In MacLink Plus, you select the translators you need, and the program displays the appropriate files. This is particularly convenient if you are working with disks containing hundreds of files.

translators to look for .WK1 files on the PC or SYLK files on the Mac, so that you won't have to pick through all the files on a disk. You then select a file and begin transferring it from a PC format to a Mac-compatible format.

DataViz offers a comprehensive list of translators for database, spreadsheet, and word processing formats. The translators, now in their third version, are thoroughly debugged; any remaining translation problems occur because of application incompatibilities. For routine transfers—MS-DOS WordStar or MultiMate to MacWrite or Word—the DataViz translators are completely reliable. MacLink Plus can transfer files at 57,600 baud (approximately 20K in 3 seconds) if the PC can keep up with it. That's no problem for an AT, but that transfer speed is usually too fast for an XT.

LapLink Mac, from Traveling Software, takes the transfer from the PC side—directories of Mac and PC files and a control menu appear on the PC screen, with only a Program Active notice on the Mac.



Apple File Exchange Conversion Options
Apple File Exchange works on a simple level, leaving many details—such as file formatting—to translator programs or translators built into applications.

LapLink Mac offers 14 PC-to-PC file translators that cover all popular PC word-processing formats, but no PC-to-Mac translators. So a typical conversion sequence might involve converting a WordStar 3.3 file to Microsoft Word 4.0 (MS-DOS version), transferring the Word 4.0 file to the Mac with LapLink Mac, and then opening the file with Word 3.01 on the Mac. This, as you may guess from the description, is not as slick as a MacLink transfer. LapLink Mac, however, does let you transfer batches of files. (Just bear in mind that the program will cause you considerable head-scratching if you aren't familiar with PCs.)

A newcomer, xFer, from Messenger Software provides the simplest interface of all these programs on the Mac. When you switch from direct to modem connection, for example, the program automatically resets to an appropriate baud rate. Another feature that sets xFer apart is that, although it offers translators from WordStar and PC Write into Word and MacWrite, the program also allows Apple File Exchange (AFE) as a transfer option. This option creates an exact byte-for-byte file copy, and assumes that you will convert files from MS-DOS format to Mac format later using the AFE utility provided as part of the System tools (see "Apple File Exchange Conversion Options"). AFE puts the transferred file into Mac-readable format on a Mac disk, but the file must still be translated either by using stand-alone translators or by opening the file within an application. (Most new applications contain a range of translators.)

Finally, xFer allows you to use PC and Mac hard disks as backups for each other. And if you really want to learn what goes on during file transfer, xFer's documentation is the most informative.

Basic Communications

If you have swapped files to a bulletin board or another computer, you'll have no problem using your favorite communications program to transfer files in binary format. The argument for communications programs over MacLink Plus, LapLink Mac, or xFer is based on cost and familiarity. If you are already an experienced MicroPhone user, for example, there's no reason to buy and learn another program to accomplish simple binary file transfers. The dedicated programs are convenient, and they provide translators for special cases, but for the basics (text-to-text, SYLK-to-SYLK, Word-to-Word) they're not necessary.

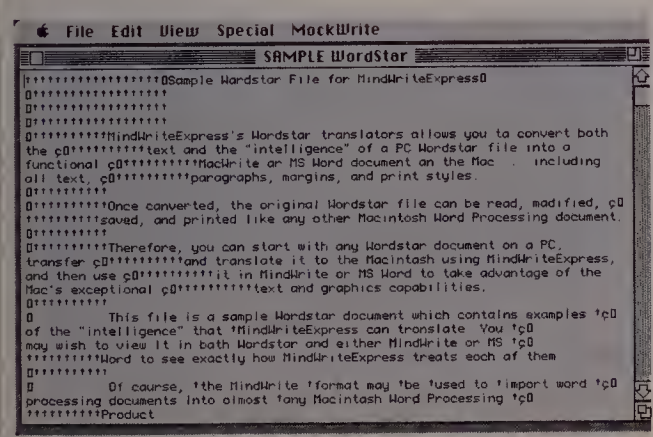
AFE and AFP Explained

The need for the Apple File Exchange (AFE) utility arises from a simple fact: Mac files have more structure than PC files. A Mac file consists of two parts (the resource fork and the data fork) and includes a variety of information (the creation date, time of last use, file type, creator, and a 31-character name). A PC file has a date of last use, an 8-character name, and a 3-letter file extension. Thus the AFE must create some Mac ingredients for newly arrived PC files, and must organize the elements of Mac files headed the other way.

The AppleTalk Filing Protocol (AFP) exists so that network users can have instant access to both Mac and MS-DOS files. The protocol provides a network file type, transparent to the user, that lets each operating system (Mac and MS-DOS) identify files created on the other type of machine. As a standard, AFP is quite credible—not only is it the basis for AppleShare, but Novell, DEC, and 3Com also support it.

The Infinity 10 can read DOS disks or be used to back up a Mac.

You can transfer files by modem or you can direct-connect (your regular modem cable won't work—you'll need a null modem cable). Most PC and Mac communications programs offer the error-checking protocol Xmodem for binary file transfer, so this step will be glitch-free. The communications program asks you to name the file and then transfers the file, placing it on the desktop as a Mac file with a blank icon. If the communications program doesn't offer binary file transfer, you simply process the file through AFE.



Format Fun

This is what a transferred file looks like before it gets translated. The translator converts all the up-arrows, spaces, and hash marks to correct spacing and formatting information.

Once it's on the desktop, you can either open the file from an application that accepts that type of file, or you can process it with a translator that converts it from the file type of one application to the file type of another (for example, WordStar to Word). You'll know if the document needs to be translated when you open it, since it will pop up with lots of strange, non-ASCII symbols (see "Format Fun").

The easiest transfers move files between Mac and PC versions of the same application. Microsoft Works on the Mac, for example, not only accepts word processing, database, and spreadsheet files from Microsoft Works on the PC, but both programs contain communications units that can automatically sign on to each other when the computers are connected. Although some features don't translate (MacWorks 2.0 graphics don't have a counterpart yet in the PC product), Works transfers are no problem even for beginners.

Thus, if you save a PC file in a format that can be opened by your Mac application, you don't need a link package. Since most current versions of PC word processors support the DCA-RFT format, and Apple File Exchange proudly features a DCA-RFT-to-MacWrite translator, you should at least be able to call up the formatted file in any MacWrite-compatible word processor.

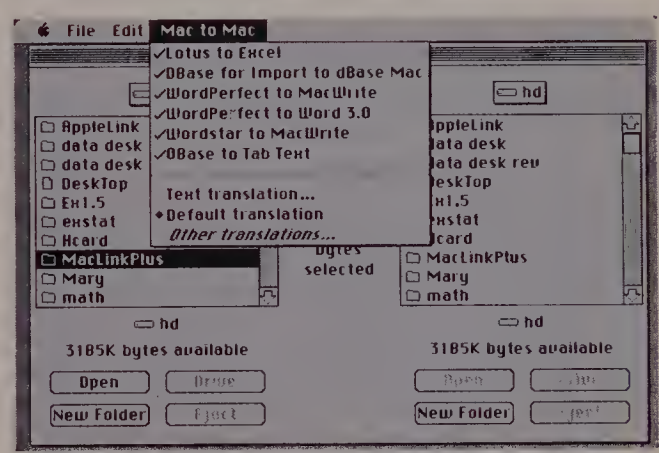
A Deluge of Data on Disk

If you have lots of disk-based data to transfer to a Mac, however, you may not want to tie up a PC all the time as a data conduit. You may prefer to buy a dedicated drive that can read standard PC disks into a Mac. Currently, there are three widely available drives, two normal units and one high-density exotic. Apple's SuperDrive is also available for Mac II, Mac IIx, and Mac SE/30. Another file-transfer solution for this case is QuickShare, a dedicated transfer controller.

Apple continues its tradition of expensive but easy-to-use hardware, by offering the Apple PC 5.25 drive. The drive works with the Mac II or SE. It requires a controller board from Apple but derives its power from the Mac power supply. This drive is easy to install (which is lucky since the drive that shipped to me came without a manual).

The PC 5.25 reads and writes to 360K disks that have been formatted on a PC. You don't see the drive's icon on the desktop; you access files under the Apple File Exchange; the files appear in a directory beneath a tiny icon of a 5¼-inch disk (see "Translators in Apple File Exchange"). Also, if you are trying to use a Mac in an office full of IBM PC ATs, you should be warned that these use higher-density 1.2-megabyte drives and typically will not write to 360K disks reliably. So unless your PCs are known to write to 360K disks reliably, the PC 5.25 isn't a solution.

Dayna's DaynaFile extends the Apple approach, being even easier to use and more expensive than the PC 5.25. In the Dayna scheme, the drive connects to the Mac's SCSI port. A drive icon appears on the screen with MS-DOS files arranged in Finder-style folders. Dayna also offers additional units to read 1.2MB PC AT 5¼-inch floppies, and both 720K and 1.44MB 3½-inch floppies. Since the DaynaFile doesn't

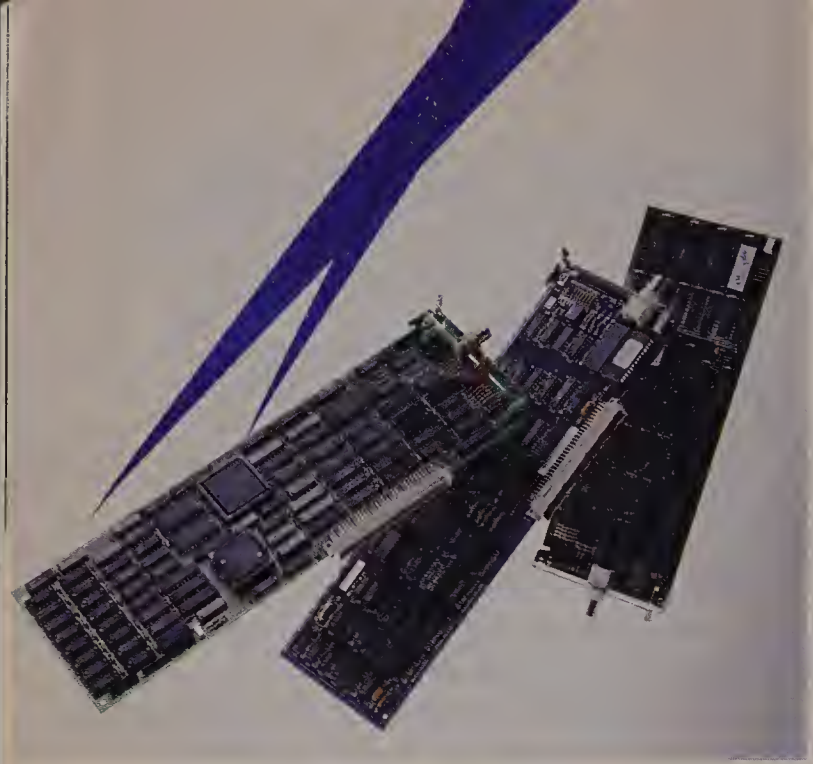


Translators in Apple File Exchange

Apple File Exchange allows you to add specific translators to the Mac-to-Mac menu. Once files have been moved from a PC disk to a Mac disk, you need to perform a format translation.

need a separate interface card, it can be used with the Mac Plus as well as the SE and II. Dayna also sells translators from DataViz (it's the equivalent of having MacLink Plus built into the system), so that you can port fully translated files over to Mac applications.

The Infinity 10 from Peripheral Land is the exotic drive choice. In standard mode, the drive uses a specially formatted 5¼-inch floppy disk to store 10MB of data and applications; its main application here is as a backup device for hard disks. Peripheral Land also supplies a utility that allows the drive to read both 360K and 1.2MB MS-DOS disks and perform a simple communications-style transfer. After transfer, you must process your MS-DOS files through an AFE/application combination or through the ubiquitous DataViz translators.



QuickShare's data transfer card gives you access to a PC's hard drive through the Mac SCSI port.

Another hardware product—the ultimate in high-speed file access—is QuickShare from Compatible Systems. QuickShare consists of a high-speed data-transfer card that fits in a PC XT or AT (not a PS/2) and special software for file conversion. The card gives you access to the PC's hard disk through the Mac's SCSI port. The PC disk appears with its own icon on the Mac's desktop.

QuickShare transferred a 285K file in less than two seconds. It's rated at 1.4 megabits per second, but in practical terms it can dump the contents of a 20MB hard disk into the Mac while you take a few sips of coffee. Put another way, you can transfer the whole hard disk in less time than it will take you to fix the margin settings in a transferred file. You can also partition the PC's hard disk to create a storage area for Mac files. Moving files from the PC partition to the Mac works like using a slightly poky extension of a Mac hard disk.

QuickShare's software, available separately as AnyText and AnyGraph, works with Apple File Exchange and takes a novel approach: besides standard options (a type of binary transfer and ASCII text), QuickShare has a conversion mode in which it captures the bitstream that would be sent to an IBM Graphics Printer. The data is translated into a formatted MacWrite document, or a MacPaint document in the case of graphics files.

This ingenious approach not only works, but it guarantees reliable file transfer from any word processor—if it prints, it will transfer—or from PC graphics program screen dumps. The translators make a variety of formatting guesses during the conversion, but on six test documents transferred into MacWrite (tabbed text from 1-2-3 and dBase, a simple WordPerfect file and a complex one, a WordStar file, and a Word file) the guesses were all correct.

QuickShare can be used with a PC that is part of a network, but it serves as a port into the network for only one Mac. But for an office in which one or two Macs are used as graphics machines or to produce financial reports from data files maintained on a PC, it's a cost-effective transfer solution and more convenient than the single-floppy drives.

Some day, all these considerations may be relics of the past. Apple's SuperDrive reads and writes both Mac and PC files on 3½-inch floppies. If file exchange and translation software were incorporated into System software, a Mac user with a SuperDrive could simply click open any type of PC file without worrying about file formats. Currently, the closest state to this blissful circumstance is life on a well-administered network.

Working with a Network

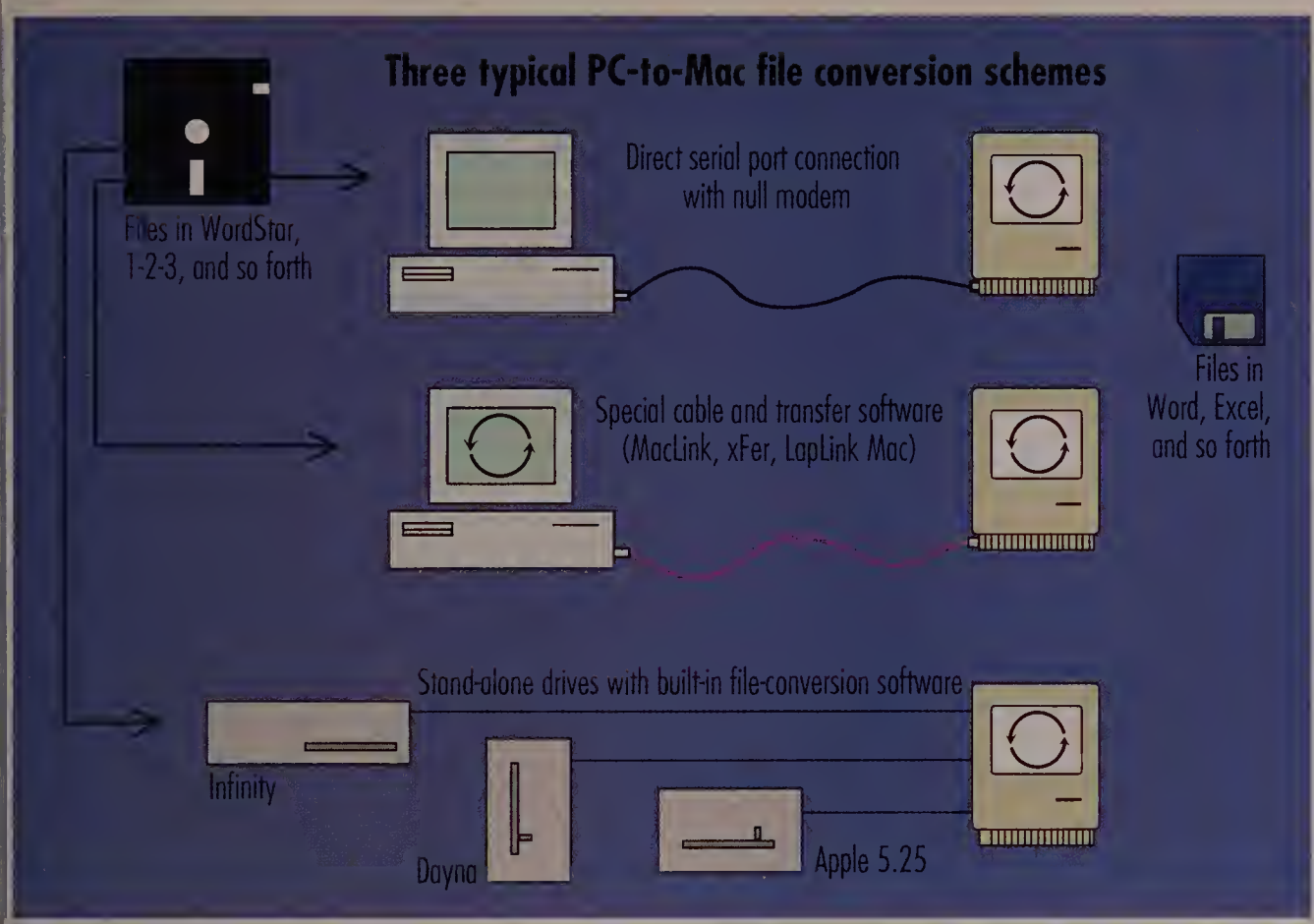
If your Mac already shares a network with PCs, you don't need to know about cables or add-on drives. You can already pull files onto the desktop—your only concern is making them work correctly in Mac applications. There are three basic ways to do this, presented here from the most authoritarian to the most democratic.

First, you can insist that everyone on the network use corresponding applications. This most often means accepting the embrace of Microsoft—thus the office uses PC and Mac versions of Word, Excel, or Works. Besides making file-transfer problems go away, this reduces training costs. The database champion is FoxBase; its PC and Mac versions are designed to work together on a network, and FoxBase is compatible with the PC's dBase standard. In some applications, specifically page layout, the matching-applications solution is the only one that will preserve your sanity. PC and Mac PageMaker files transfer back and forth effortlessly, graphics included; there is no other easy or obvious way to attain this harmony.

As a second option, you can insist that network users keep common-format versions of their files available for transfer. For word processing, this would mean saving documents in DCA-RFT format or as ASCII text. For spreadsheets, SYLK and DIF formats are available from nearly every application; you won't be able to transport macros between 1-2-3 and Excel, but you won't

Transfer Triumphs (and Failures)

When you transfer this type of PC file	To this type of Mac file	You keep . . .	But you lose . . .
Excel 2.0 (converts as SYLK only)	Excel 1.5	values, most functions, custom dialog boxes, Mac-compatible macros	charts, some functions
Multiplan SYLK	Multiplan SYLK	data, functions	
Works 1.01	Works 2.0	data files	
DCA/RTF	MacWrite	rulers, text format, Mac-compatible fonts	
WordPerfect 5.0 (saved as WordPerfect 4.2)	WordPerfect 1.0.1	text format, headers, columns, footnotes	graphics
Word 4.0	Word 3.01	text with styles	graphics
PageMaker 3.0	PageMaker 3.0	text, TIFF, paint files	display of HPGL, draw, and EPS files (files will still print)
dBase III	dBase Mac	data files	programs, reports
dBase III	FoxBase+/Mac	data, programs, reports	
database tabbed text	database tabbed text	data	relational structure, programs



have to reenter data or formulas. For database files, plain old tab-delimited text is a reliable transfer format that's universally accepted; once more, your data will transfer even if programming elements won't.

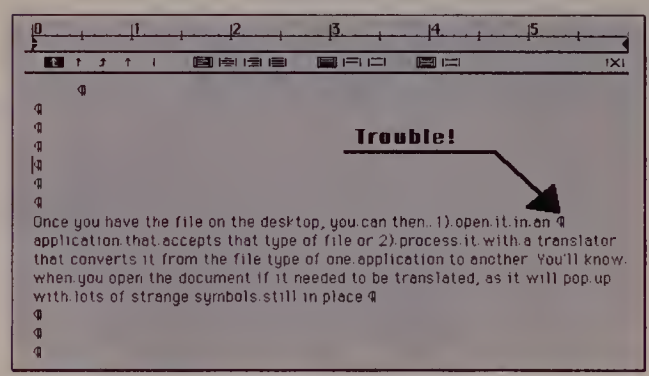
The third and most anarchic option is to equip the Mac side of the network with lots of file-translation capability and hope for the best. Some networks already implement this: TOPS, for example, uses DataViz's basic translator set. A few Mac applications stand out in their ability to handle file formats that others might overlook. MindWrite 2.1, with the MindWrite Express option, can open and save nearly a dozen types of PC/Mac word processor file formats, and Wang and VAX files also, using special translators licensed from DataViz. An artwork utility called The Curator performs analogous tricks for transferred binary graphics files, accepting and translating PICT, TIFF, MacPaint, and encapsulated PostScript (both IBM and Mac).

File-Transfer Problems

Transferring spreadsheet and database data is usually straightforward. Even graphics transfer is straightforward in a perverse sort of way; either it's automatic, using a product such as AnyGraph or The Curator, or you can't do it at all. The problem child in the transfer family is word processing.

Some word processing formatting won't transfer exactly. Margins in many PC word processors are set by character count since the word processors are character based. When the translated data is opened in a proportional Mac font, the appearance changes. One trick is to save the document to Microsoft Word format in the PC application before transfer. Since Word sets the PC document margins in inches, the results are often better after translation. Likewise, you may find that you have better luck saving a document to DCA-RFT format within the PC application and then translating the transferred file to MacWrite with the translator built into Apple File Exchange, rather than counting on a perfect native-to-native translation. If a long document looks so scrambled at the Mac end that you'd spend hours touching up its appearance, it's worth looking it over once in a monospaced font like Monaco to determine whether all your problems arise from spacing translation or whether there was something untranslatable in the original document.

One frequent glitch that you can fix before transferring a file results from hidden characters. In the sample text "Hidden Gotchas," a bit of cutting and pasting has left a paragraph symbol at the end of the first line. In a long, much-edited document you can inadvertently accumulate an amazing number of these. When you view this piece of document in the usual way with special symbols hidden, all appears well. When you attempt to transfer this paragraph, there will be an unwanted paragraph break after the first line. Although this case isn't severe, it is an illustration of a general rule: if you can, look over PC documents with nonprinting characters displayed, before transfer. You may find, besides an assortment of unwanted paragraph symbols, other mystery characters that can result in whole paragraphs being translated into single lines with margins set three feet to the right. As a rule, unfamiliar nonprinting characters present file translators with a problem they can't solve, since the translator has to assume anything it comes across is intentional, rather than a bit of formatting left behind by a cut.



Hidden Gotchas

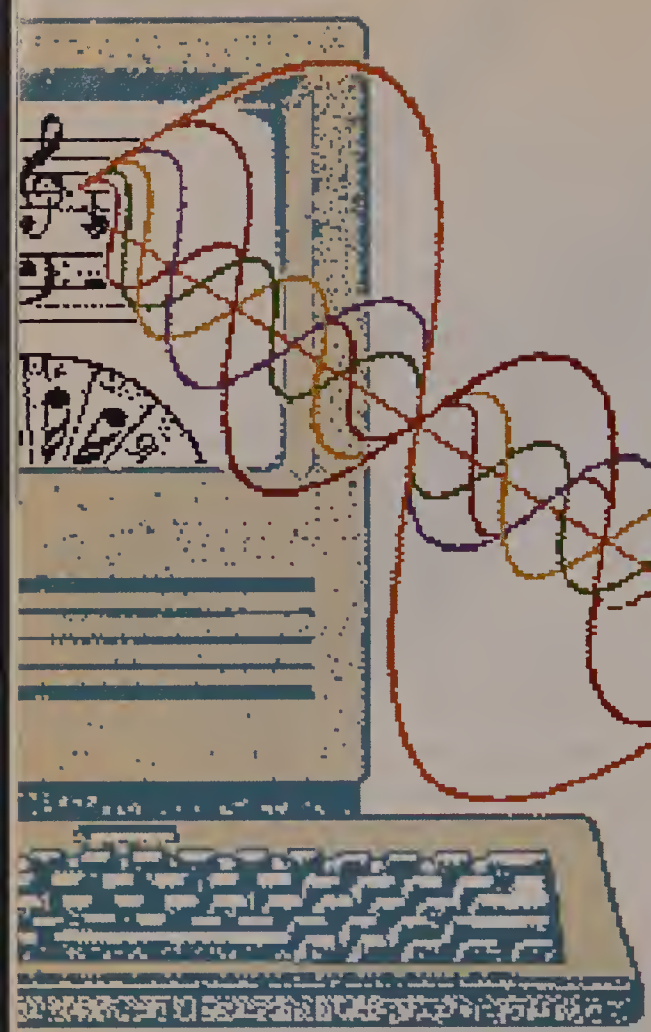
This screen shows one of the most typical kinds of glitch that defeat translator programs. When this text converts, there will be an unwanted paragraph break at the point shown.

What to Use

Most PC-to-Mac transfers are easy enough that you can puzzle them out using only Apple File Exchange and a communications program. If you will be doing a variety of transfers, you might want to throw a modest amount of money at the problem to automate it with dedicated software. If you will need to transfer large quantities of disk-based files, special-purpose drives for transfers are worth considering. Finally, if your Mac is linked to PCs on a network, a little time spent in setting file-transfer standards and inspecting word processing documents for hidden characters pays off handsomely. □

See *Where to Buy* for contact information.

Music for Beginners



by Steve Cummings

Despite Apple's best efforts to portray the Macintosh as a business machine, musicians in increasing numbers are discovering that the Mac still has a song in its heart. The Macintosh's innate musical abilities and superior selection of musical software have made it the predominant personal computer among music professionals today. But you don't have to be a Hollywood producer with a roomful of equipment to make beautiful music with your Macintosh. Invest in a few reasonably priced programs and perhaps a MIDI synthesizer, and you can get started using the Mac for computer-assisted composition, notation, performance, and recording. If you're new to music, the Mac can also function as an excellent tutor.

Hardware

Just as it comes from the box, the Macintosh can generate *polyphonic* (more than one note at a time), *multitimbral* (more than one tone quality, or timbre, at a time) sounds. Four voices is the most the Mac can produce without a synthesizer, but some programs can trick you into hearing six. The sounds the Mac uses can be synthetically created waveforms or digitally recorded *samples* of real sounds—anything from ordinary musical instruments to dog barks. With these capabilities at your fingertips, you can faithfully approximate a jazz quartet, a rock combo, or a small chamber group.

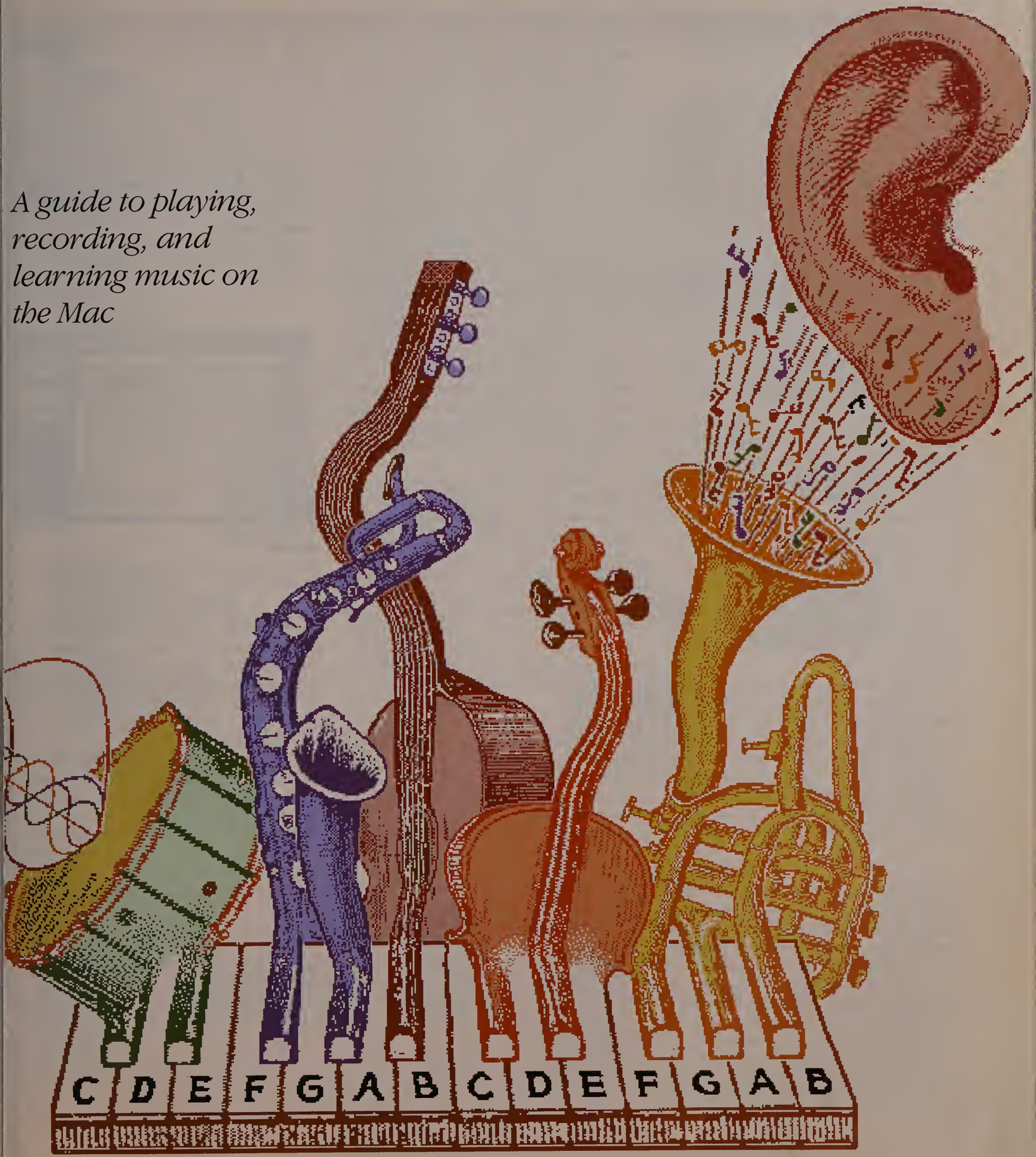
When heard through its tiny built-in speaker, the Mac's sound can hardly be called robust and will win no awards for clarity. But hooked up to a stereo or other decent sound system, the Mac sounds surprisingly full-bodied (see "Get Amped"). When you outgrow the sound capabilites of an unaided Mac, a synthesizer or other electronic instrument can help the Mac deliver more notes, more timbres, and better sound quality. The Mac controls synthesizers through the magic of the Musical Instrument Digital Interface, or MIDI—the universal standard for communications between electronic instruments.

For a first MIDI setup, choose a multitimbral synthesizer; several reasonably priced models are available. In addition to synthesizers, a MIDI'd Mac can control stand-alone digital *samplers* (digital recording machines that record and play back sampled sounds polyphonically in high fidelity), drum machines, sound effects devices, mixers, and even lighting equipment. "Make Mine MIDI" diagrams two MIDI systems.

Sequencers

Ever since guitarist Les Paul pioneered multitrack overdubbing in the fifties, musicians have been exploiting technologies that let them build richly arranged recordings from individual parts played one at a time. Magnetic tape serves the purpose fairly well, but its sound quality deteriorates rapidly with repeated overdubs, and editing is difficult. A Mac and a good se-

A guide to playing, recording, and learning music on the Mac



quencer is a better alternative for electronic instruments. (You'll still need a tape deck to record vocals and acoustic and electric instruments.)

Sequencers have some elements in common with both tape recorders and old-fashioned player pianos. Like a tape machine, a sequencer lets you capture music on separate tracks. You record by playing on a MIDI keyboard connected to the Mac or by using the mouse to construct passages too difficult for your keyboard skills. Like a player piano roll, however, sequences aren't recordings of the sound of the music itself; they're series of detailed instructions that tell a synthesizer how to recreate the music. When you enter a tune from the keyboard, the sequencer stores more than just the notes; it can store all kinds of expressive nuances, including information about timbre, volume changes, pitch bend, and vibrato, as well.

But a sequence has one big advantage over a piano roll or a tape recording—you can edit it to your heart's content. A typical sequencer program includes options that enable you to move notes via cut-copy-paste commands, transpose with a click of the mouse, make tempo changes without changing pitch (try that on a tape recorder), *loop* tracks so they play repeatedly, or *quantize* your music to correct rhythmic mistakes. Once the sequence is in its final form, you can use it in live performances or play it back for conventional recording.

The market for Mac MIDI sequencers is crowded and competitive, and quality is high, so singling out the best program for your needs can be difficult. If you're just getting started with MIDI, SouthWorth's inexpensive and uncomplicated One-Step will keep you plenty busy while you learn the ropes. Alternatively, you may want to bag as much MIDI firepower from the start as your budget can accommodate. Desirable high-end features include separate looping settings for individual tracks, and variable tempo and time signatures. Ideally, the sequencer you select should read and write MIDI Files, a new file format for MIDI data exchange.

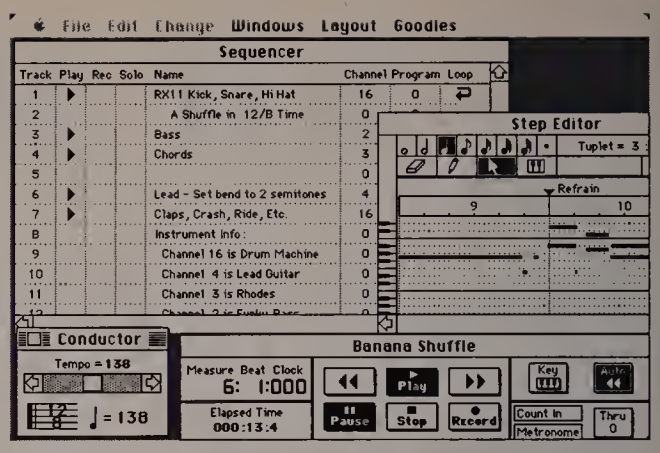
The two most popular MIDI sequencers, Mark of the Unicorn's Performer and Passport Designs' Master Tracks Pro, both offer a wealth of features for broad-brush editing and for razor-sharp control over individual musical events. Performer probably has the edge in sheer number of features; on the other hand, Master Tracks' graphical approach to editing MIDI data is easier to learn (see "Master Tracks Pro").

The current offering from Opcode, Sequencer 2.6, doesn't let you edit individual events. The program does boast a unique set of sequence-control features, however, including the ability to trigger sequences within other sequences, and to start sequences from your MIDI keyboard during performances.

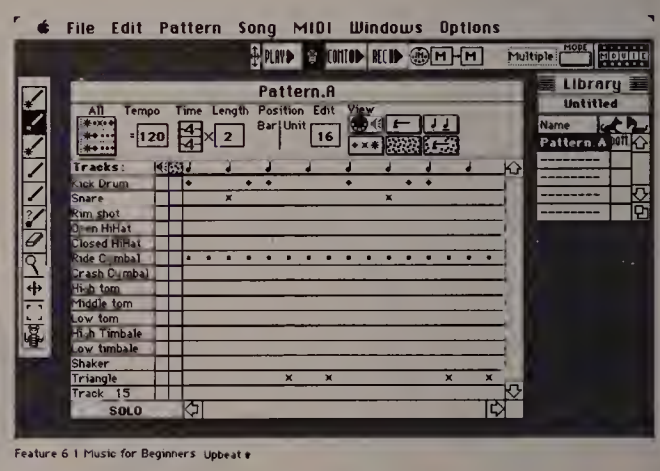
Since today's drum machines are MIDI instruments, they can be controlled by the same sequencer you'd use to drive a synthesizer. Nevertheless, two or three companies have come up with special sequencer-like programs optimized for electronic rhythm instruments.

Intelligent Music's UpBeat can control any MIDI drum machine, and using its simple screen grid you can place conga slaps or cymbal crashes easily and precisely on any subdivision of the basic beat (see "UpBeat"). Like Intelligent Music's other products, UpBeat can be set to add a degree of controlled randomness, making the rhythms sound less mechanical.

Primera's Different Drummer works much like UpBeat, though it lacks randomizing features. On the other hand, you don't need a drum machine to play your rhythm tracks. In addition to being able to output through MIDI devices, Different Drummer can play sampled sounds through the Mac. The program comes with a ready-to-use library of 30 percussion instruments.



Master Tracks Pro
Passport Designs' hot-selling sequencer lets you edit MIDI data graphically as well as numerically.



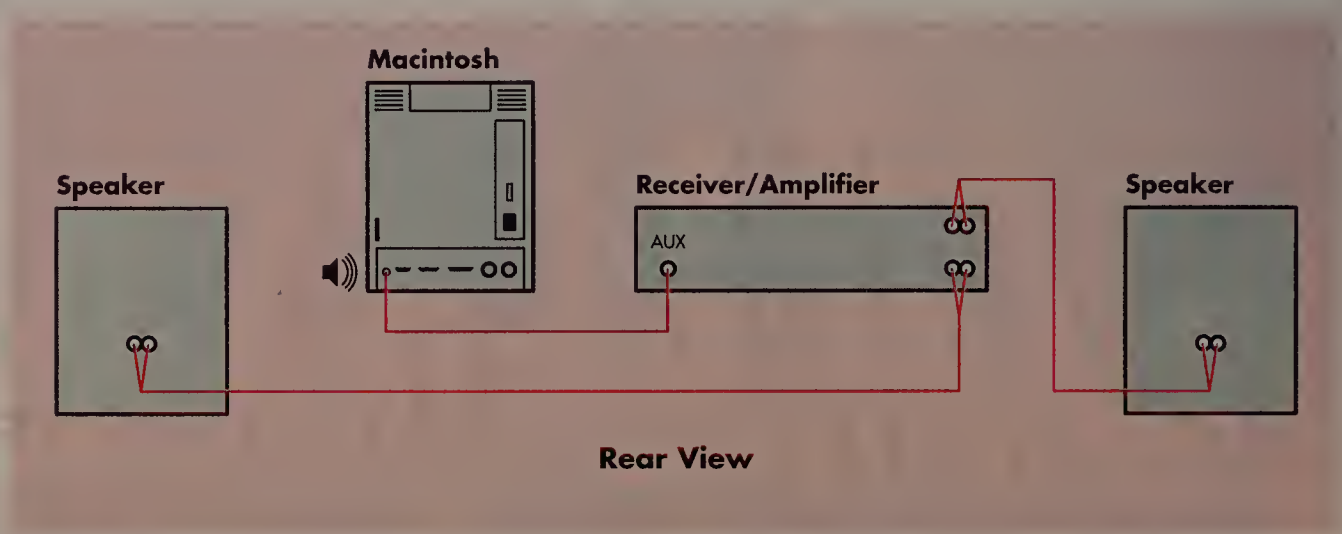
Feature 6 | Music for Beginners Upbeat

UpBeat
The UpBeat grid for creating drum machine patterns.

Mac as Axe

If you want to make music but you've never learned to play an instrument, maybe you should try playing the Mac instead. Several programs turn the computer into an intelligent instrument that collaborates

Get Amped
To hook up a Mac to a home stereo system, you need a cable with a modular phone plug on one end for the Mac's speaker port, and a standard RCA plug on the other for the Aux jack on the receiver or amplifier. Switch the stereo to the mono setting to hear music out of both speakers. The Mac's output is actually hot enough to drive small speakers at reasonable volume, so you can hook up directly to the speakers if you prefer. You can also plug headphones into the Mac's speaker port, but you'll need a mono-to-stereo adapter to hear music from both earpieces.

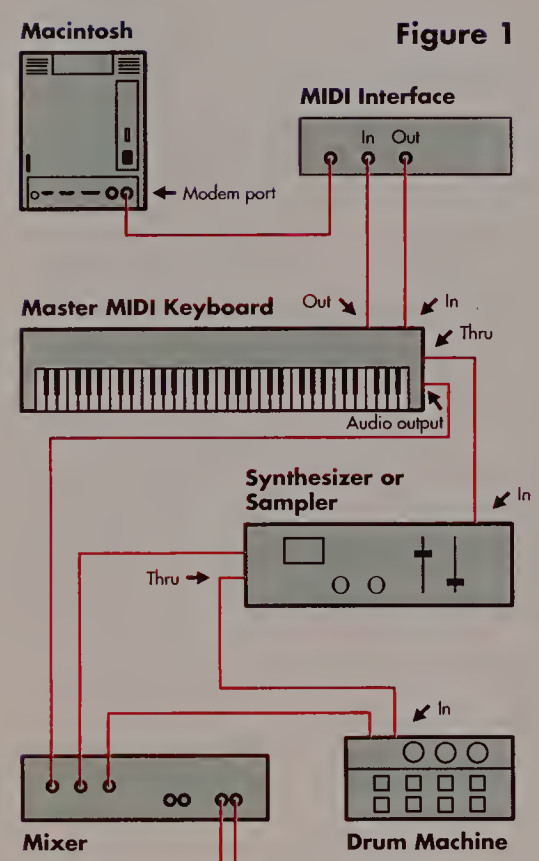


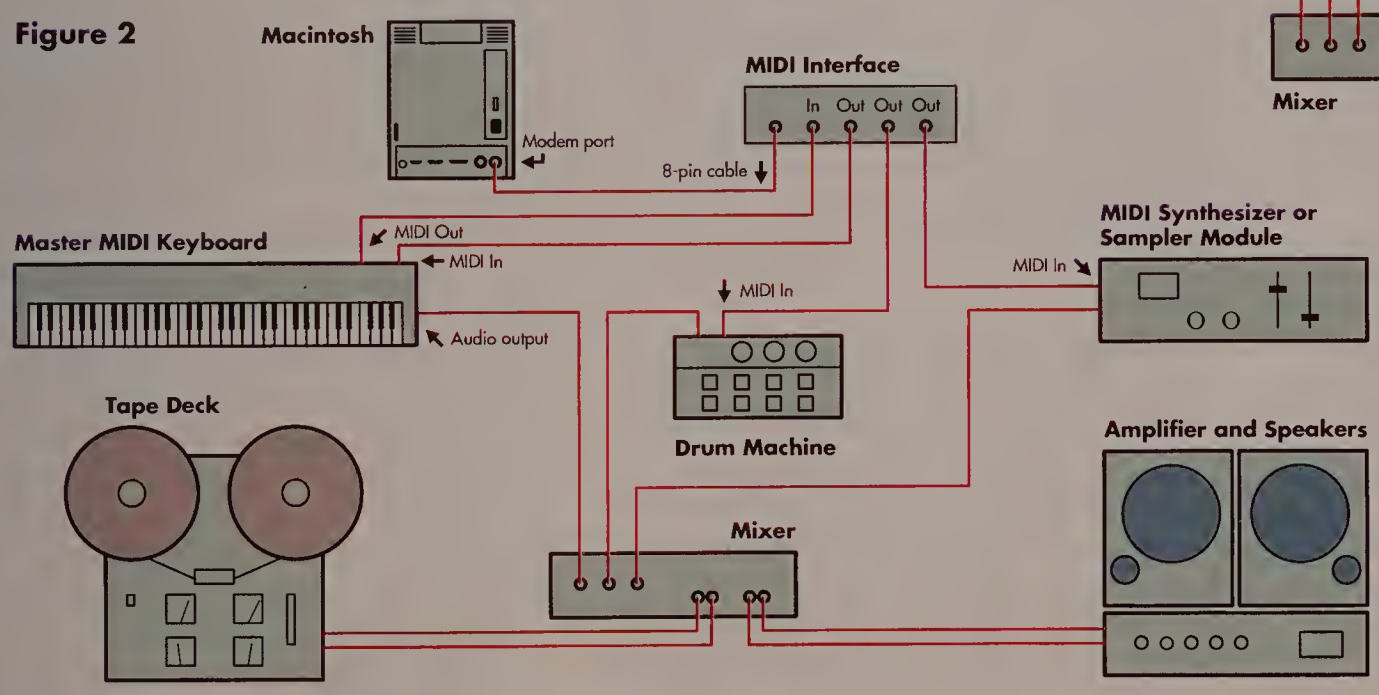
Make Mine MIDI

When you're ready for a MIDI'd music system, connect a MIDI interface to your computer's modem and/or printer ports. Opcode and Passport Designs both make MIDI interfaces to suit a range of systems and budgets, and even Apple sells an inexpensive model. Then run MIDI cables from the interface to all of your instruments.

Although you can connect the MIDI Thru port of one instrument to the In port of the next (as in Figure 1), it's best to use an interface with multiple Out ports, or a MIDI *splitter box,* so that each instrument is connected as directly as possible to the Mac (as in Figure 2).

For multitimbral sound at a reasonable price, the $199 Casio NT-240, with pint-size keys, or the $349 CT-640, with full-size keys and more sounds, make excellent choices. If you're willing to use a synthesizer with no keyboard, check out the Yamaha FB-01 ($375) or the Kawai K1M ($549). In addition to a wide range of instrument sounds, the K1M comes with a slew of sampled drum sounds, so it can double as a drum machine.





with you in making music. You decide which sounds to use and when to change musical direction, while the program chooses most or all of the notes.

For example, whether your tastes run to classical or heavy metal, you can improvise for hours with Brøderbund's Jam Session and never play a sour note. While you solo on the Mac keyboard, one of Jam Session's animated bands performs on screen and backs you up (see "Jam Session"). Every key you play on the Mac produces a predefined, satisfyingly authentic riff tailored to the song you've selected. If you know standard musical notation, you can substitute your own patterns for the stock riffs.

Jam Session relies entirely on the Mac's built-in sound-generating talents. But since it uses sampled instruments, it sounds pretty good—the flutes sound realistically breathy, and metal power chords have a genuine crunch.

If you're ready to stray a bit from the path of recognizable genres, try Opcode's Music Mouse. As you move the mouse pointer across a grid on the screen to select notes, Music Mouse harmonizes your melody in one of five scales and outputs to the Mac or as MIDI. The resulting goulash won't be tightly structured or very complex; to your ears it may sound oddly beautiful, or unbearably bland.

Marry a little artificial intelligence to the recording and editing capabilities of a sequencer under a full moon at midnight and you might come up with a trio of even farther-out programs: two programs from Intelligent Music—Jam Factory and M—and the new Mac version of Dr. T's Keyboard Controlled Sequencer Level II (KCS). Carrying the intelligent instrument idea much, much further than Music Mouse, these programs take the notes you enter and play them back in a myriad of partially random permutations, all according to guidelines you define and within limits you set.

If you like living dangerously, these programs should be your cup of Long Island iced tea, for you're always tottering on the brink of total cacophony. By choosing the randomization limits carefully, however, you can achieve delightfully quirky, but still more or less toe-tappable, musical results. Check out the tapes recorded by Intelligent Music's own staffers for proof.

Jam Factory and M enable you to record your sessions and play them back, but for substantial editing you have to export work to a more conventional sequencer. You won't need to export KCS creations, since the program has a full complement of sequencer features. KCS is a hacker's dream; be prepared to look at screens full of tiny numbers. The program does offer some unique features, however.

The Sounds of Music

In the sixties, synthesizer pioneers laboriously crafted new sounds for their instruments by interconnecting a welter of mysterious black boxes via cables, or *patch cords*. Today you can use your computer to create *patch files* that contain the synthesizer settings necessary to produce any sound you want. *Sound editing* programs display the parameters that make up a sound on screen and give you controls for adjusting those values with ease. As you make changes on the screen, you hear the results instantly from your instrument. When the sound sounds right, you can save the configurations either directly in your synthesizer memory or on disk for later downloading.

Getting just the sound you want from your synthesizer remains a demanding art, but editing programs make the mechanics as painless as possible. Editing programs are particular; you'll need one that's made specifically for the MIDI instrument you use.

Though they look just like synthesizers, stand-alone digital sampling devices work differently. Instead of generating sounds from scratch as synthesizers do, samplers record sounds digitally and then let you play them back at any pitch. While it's easier to create a wide range of sounds with a synthesizer, a sampler gives you access to harmonically complex sounds, from grand pianos to trash can lids, that most synthesizers simply can't duplicate.

Stand-alone digital sampling devices have their own editor programs, though they work a bit differently than their synthesizer-oriented counterparts. A sample editor lets you view and manipulate a sample's actual harmonic content, not just the numeric settings you work with in a synthesizer editor. With packages such as Digidesign's Sound Designer or Blank Software's Alchemy you can remove hisses or hums from the sampled sound with surgical precision, adjust equalization, or select loop points (using a short looping section of a sample for sustained tones conserves precious sampler memory). And with Digidesign's TurboSynth, you can even sculpt entirely new sounds from scratch, turning your sampler into a high-powered synthesizer.

Synthesizer Housekeeping

Like surfers chasing the perfect wave, few synthesizer or sampler owners can resist the constant allure of new sounds to add to their collections. Even though many modern synthesizers can store the equivalent of several orchestras, most electronic musicians soon fill the available storage space and need a place to park their spare sounds.

With *librarian* software, you can file away as many sounds as you have disk space for, and you can group sounds by type (woodwinds, brass, sound effects, and so on) or according to their use ("syrupy June wedding sounds"). Again, each synthesizer model requires its own librarian.

Today, packages for the most popular synthesizers and other MIDI devices combine editor and librarian functions. Opcode's preeminent series of well-integrated editor/librarians covers over 20 machines. The screens of most of the Opcode editors are busy, but they're well-organized, and the programs offer several convenient methods, both mouse and Mac keyboard, for changing sound settings.

Dr. T's new Mac editor/librarians are just as functional as Opcode's but have a cleaner, less cluttered look. Since they achieve this look by splitting up the sound settings over more windows, however, you'll have to do a bit more window switching.

Even if no one makes an editor for your prize synthesizer, you should be able to find a package with librarian-only functions on Opcode's extensive list. If you have more than one synthesizer in your MIDI system, you can combine the appropriate Opcode librarians into a single program to minimize disk switching.

For owners of digital samplers, Alchemy offers many sophisticated librarian functions, including a feature that lets you record and store samples at the highest possible sonic resolution and then convert them to the format of any compatible sampler.

Scoring Big

If you read and write standard musical notation, or want to learn how, the Mac can give you tools for building compositions with conventional musical symbols: staves, clefs, key signatures, and so forth. Notational software boasts some important advantages over scribbling out notes with pen and paper, but you may find it has a few negatives as well.

For example, don't expect to be able to input music much faster than you could write it by hand. While these packages bend over backwards to make adding new notation easier, it still takes longer to choose a note's pitch, rhythmic value, and position with the Mac than it does to dash it off on paper. Many notation programs enable you to input music directly from a MIDI keyboard, and some can notate files

Jam Session
One of Jam Session's canned bands. You solo on sax, piano, or bass from the Mac keyboard.

recorded in MIDI sequencers, but you'll still usually have to do a substantial amount of editing to make the finished product look the way you want it to.

You will pick up efficiency, though, when you start to make changes and corrections to a developing score. Instead of a big eraser or a bottle of white-out, all it takes is an agile mouse hand to remove an errant note or alter a harmony. To notate repeating passages, you can simply copy and paste, transpose your selection if need be, and then touch it up as appropriate for its new musical context.

Notational software's ability to play your music while you compose it counts as another big plus. With a good multitimbral MIDI setup, you no longer have to put together an orchestra to hear how the piece will sound as a finished arrangement. When it does come time to give the piece to real musicians, you can print it using a PostScript font and make stunning, publish-quality manuscripts. If you're writing for an ensemble, you can have the software print out each instrument's part separately, properly transposed to the appropriate key.

Beginners, or those who just want to get their feet wet, can choose among several reasonably priced notational programs, including ConcertWare+, MusicWorks, StudioSession, and Deluxe Music Construction Set (DMCS). They all have particular strengths, but among the budget notation-oriented programs the best choice for scoring chores per se is unquestionably DMCS, which should be available in version 2.5 by the time you read this. DMCS is unmatched in its class for its array of vital manuscript elements, including slurs, ties, tuplets, and common dynamic markings. The program is appropriate for lead sheets, four-part vocal arrangements, and other moderately complex compositions. And it's no slouch for music playback, offering multitrack output with the Mac's own synthesizer voices or through MIDI.

Serious composers, arrangers, and songwriters should look to still more sophisticated—and pricier—notational tools, which offer wider selections of musical symbols and more powerful editing control. (For more information on notation programs, see "Music Processing: The Next Generation" in the July 1988 issue of *Macworld*).

The Music Lesson

If you can't tell a triad from a tritone, the Mac can help fill in the gaps in your musical education. The ability to recognize intervals, melodies, rhythms, and chords by their sounds is a fundamental musical skill, but it's one that most people acquire only through long hours of practice. Getting that practice has always been a major problem; human instructors don't have the time to drill individual students, and tape recordings are cumbersome and inflexible. Music software can serve up as many ear training drills as you care to tackle and can tailor them to emphasize the particular areas where you need work.

Resonate's excellent Listen 2.0, for example, plays intervals, melodies, or chords (including the ninth, eleventh, and thirteenth chords used extensively in jazz) with the Mac's own sounds or using MIDI. You pick out what you think are the matching notes on a keyboard or guitar fretboard on the screen, or on a MIDI keyboard, and Listen gives you immediate feedback on your accuracy. You can control how difficult the musical questions are, and if you like, Listen gives you hints, telling you whether your incorrect responses are too high or too low.

Listen won't help if you need practice in identifying rhythms or in notating the sounds you hear. For honing these skills, you can turn to Ars Nova's Practica Musica, another well-designed ear-training program. While Practica Musica lacks Listen's chord drills, otherwise it's a complete ear-training course that tests your ability not only to identify intervals, melodies, and rhythms but also to notate them on a standard musical staff. Other program exercises cover sight reading and chord spelling (you're given the name of a chord, and you have to "spell" the notes it contains). In many of the drills, the program automatically drops you back to easier material when you start to get answers wrong.

The Well-Tempered Studio

When you're new to the Mac or to music, or both, it makes sense to start with one or two simple software products and explore their possibilities fully while learning more about your computer, electronic sounds, or music theory. Once you have some experience under your belt, you may be tempted to indulge your musical habit by putting together a Mac-supervised studio. A carefully assembled collection of programs can work together to take you painlessly all the way from that tune running through your mind to the finished composition.

Once your home studio is in place, you might start a typical session by using your librarian program to select the sounds that will go best with your song, perhaps with a turn at an editing package to hone a sound or two until they perfectly suit the mood you want to create. Then move to the sequencer, to enter themes and experiment with harmonies and arrangements. As the piece takes shape, use the sequencer to add transitions, repetitions, and variations in a flash. Eventually you will have a polished creation, ready for the tape recorder. Transferring the file to a notation program, you add expressive instructions, touch up the music for looks, and print it out. Tape and printed score in hand, you're ready for the record company, the Library of Congress, or at least your own circle of musical compadres. □

Kathy Geisler, oboist with San Francisco's Visible Symphony, likes composing on the Mac because "it lets me immediately hear and edit my musical ideas."

See *Where to Buy* for contact information.

Formerly a regular contributor to Keyboard *magazine, Steve Cummings is a writer who makes sporadic appearances on electronic keyboards in a San Francisco Bay Area band.*

Macintosh IIx

The Compact Mac

The Mac IIcx: Apple puts the power of a Mac IIx in a smaller, quieter box and comes up with the Mac II you always wanted. But can you afford it?

by Lon Poole

You like the Mac II and the Mac IIx for their speed and expandability but hate how they commandeer desk space, blow noisily, look like generic computers, and cost so much. Enter the Mac IIcx; there's more to like and less to dislike.

Technologically the Mac IIcx breaks no new ground. It is a refinement of Macintosh models that have gone before it, notably the II and IIx. From a consumer standpoint, it is a major new machine and a compelling one. Apple's product managers and engineers listened to what you and I liked and didn't like, and they built a machine that will please many of us. Too bad Apple marketing couldn't make it more affordable.

Look It Over

As you can see in "II Long, II Short," the new Mac IIcx looks like a compact, or cut-off, Mac II. If you put an Apple monochrome monitor atop a IIcx, the combination looks a lot like a classic Macintosh. If you have a wider monitor, you can set the IIcx on its side and put the monitor alongside. The four rubber feet are easy to move from the base of the IIcx to its side. The case has been carefully designed to work in a horizontal or vertical orientation. If you'd rather have the IIcx off your desk, you can set it on the floor, put it on a shelf, or hang it from the wall using a special bracket that Apple says will be available from third parties.

The case is made of plastic with a metallized interior for radio-frequency shielding. Air vents are located on the front and back; there are no air vents on the sides or the bottom and only noncritical vents on top. A large-diameter cooling fan moves air from front to back without making much noise.

Look Inside

Inside the box are a floppy drive, a hard disk (most likely optional), a speaker, a logic board, and a power supply. One pleasant but not so obvious improvement over the Mac II is that the entire machine can be disassembled quickly for efficient servicing (see "Five Easy Pieces").

Once the IIcx has been disassembled, you can easily see all the components on the logic board (see "IIcx Logic Board"). The three NuBus slots on the Mac IIcx logic board are identical to the six slots in a Mac II or Mac IIx. However, there is slightly less headroom in a Mac IIcx, and the cutout in the back panel is a bit shorter. All NuBus boards that meet the physical specifications published by Apple at the March 1987 introduction of the Mac II work in the IIcx. Apple has found only a few boards that don't fit, and has alerted the manufacturers to the problem.

The IIcx has eight Single Inline Memory Module (SIMM) slots for memory. You can expand to 8MB of RAM using 120-nanosecond SIMMs widely available today. Those are the same SIMMs used in the Mac IIx and Mac SE/30. Apple has successfully tested the IIcx with 4MB SIMMs. When they become available, you will be able to increase the total memory capacity of the IIcx to 32MB. There's plenty of headroom to accommodate tall SIMMs.

The IIcx has the same 256K ROM as the IIx and SE/30, but the ROM chips are soldered directly to the logic board to reduce manufacturing costs. This ROM includes color QuickDraw, so it supports color and

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The screen images used on the cover and within the article were developed by Duane Maxwell, Craig Davidson, and Janice Cornforth, with software from Pixar and Digital Dreams, on a Mac II equipped with a Levco Translink II.

PHOTOGRAPHS BY FRED STIMSON

Features and Specifications

	Modular			Compact
	Mac IIcx	Mac IIx	Mac II	Mac SE/30
Processor	68030	68030	68020	68030
Memory Management Unit	integral	integral	optional 68851 PMMU	integral
Processor cache	instruction and data	instruction and data	instruction	instruction and data
Math coprocessor	68882	68882	68881	68882
Clock speed	15.6672MHz	15.6672MHz	15.6672MHz	15.6672MHz
Maximum RAM*	8MB	8MB	8MB	8MB
ROM	256K replaceable with SIMM	256K SIMM	256K socketed chips	256K SIMM
Internal floppy drives	1	1 or 2	1 or 2	1
External floppy drives	1	0	0	1
FDHD (SuperDrive) support	yes	yes	no	yes
Half-height internal hard disk	3.5 in.	5.25 in. or 3.5 in.	5.25 in. or 3.5 in.	3.5 in.
Internal expansion slot	3 NuBus	6 NuBus	6 NuBus	1 030-Direct
Video display	not included	not included	not included	built-in 9-in. b&w
Color/gray-scale support	yes	yes	yes	yes
Sound output	stereo	stereo	stereo	stereo
Power	yes**	yes**	yes**	yes**
Dimensions (in inches)	5.5 x 11.9 x 14.4	5.5 x 18.7 x 14.4	5.5 x 18.7 x 14.4	13.6 x 9.6 x 10.9
Footprint (in square inches)	171.4 or 79.2	269.3	269.3	104.6
Weight (in pounds)	14	24–26	24–26	19.5

* Using 1MB SIMMs.
** Worldwide power supply automatically configures itself to local electricity.

gray-scale monitors. The ROM can be upgraded if necessary by removing a jumper cable and inserting a ROM SIMM into the socket provided for it.

The logic board in the IIcx also contains the Apple Sound Chip (ASC), which provides 8-bit digital stereo sampling at 44.1kHz and includes four-voice wave-table synthesis. The same ASC is also present in the Mac IIx and SE/30. Sound is output through the front-facing internal speaker or through the audio jack on the back panel.

II Long, II Short
A Mac IIcx is about 6½ inches narrower than a Mac II.

A Mac IIcx has a self-adjusting worldwide power supply; you can plug the IIcx in anywhere in the world and it adjusts itself to the local electricity. A replaceable battery on the IIcx's logic board backs up a small amount of memory, known as Parameter RAM, which retains user preferences set via the Control Panel. On the back panel is the power switch, which can be locked on so that the Mac IIcx restarts itself in the event of a temporary power outage—even if the battery isn't working. In contrast, a Mac II or Mac IIx won't restart itself under the same conditions.

Slowing Down at Thirty

Like the Mac IIx and the Mac SE/30, the Mac IIcx uses a 68030 microprocessor and a 68882 numerics coprocessor, both running at a clock speed of 16MHz. At 16MHz the 68030 doesn't offer much performance advantage over the Mac II. You can buy 68020 accelerators for the SE that operate at 25MHz and outperform Apple's 68030 offerings. One potential item of concern is that the 68030 on the Mac IIcx is soldered to the system board and not socketed like the CPUs in the II and the IIx. This means that down the road, upgrading to a 68030 with a faster clock speed may not be as easy to implement as, for example, the DayStar 68030 upgrades for a Mac II.

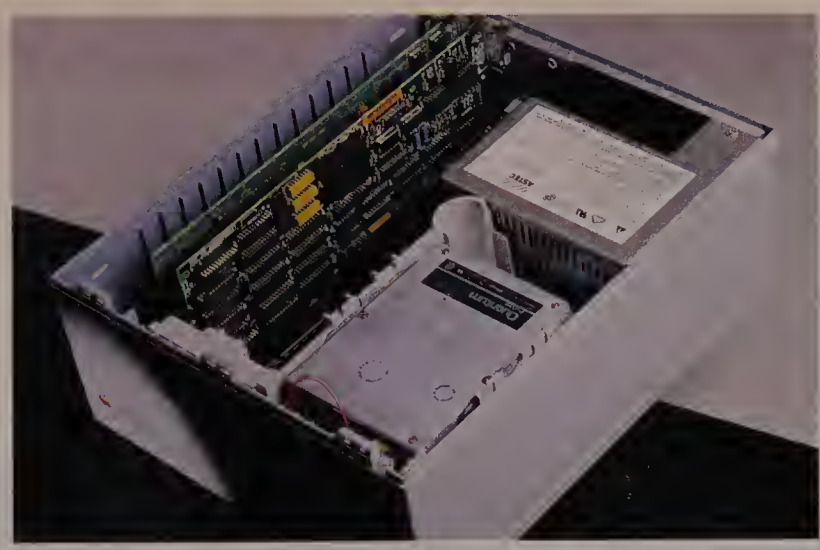
Mac SE	Mac Plus
68000	68000
no	no
no	no
no	no
7.83MHz	7.83MHz
4MB	4MB
256K socketed chips	128K socketed chips
1 or 2	1 or 2
1	1
no	no
3.5 in.	no
1 SE Expansion	no
built-in 9-in. b&w	built-in 9-in. b&w
no	no
mono	mono
yes**	105–125 VAC, 50–60Hz
13.6 x 9.6 x 10.9	13.6 x 9.6 x 10.9
104.6	104.6
17–21	16.5

The key to the updated microprocessor in this new breed of Macs is that the 68030 (in contrast to the 68020 used in a Mac II and on a number of accelerator boards) has a built-in Paged Memory Management Unit (PMMU). The PMMU makes the Mac IIcx ready now for future Macintosh System software that will feature true multitasking. You can add a separate PMMU chip to a Mac II and to a few SE accelerator boards, but most accelerator boards require their own on-board RAM, and they limit the amount of system-board RAM used (see "Processors: Is Faster Better?" in last month's *Macworld*). However, until Apple releases such a System version, only A/UX can take advantage of the PMMU. Apple does plan to release an A/UX-equipped version of the IIcx.

Driving the IIcx

The internal floppy disk is Apple's Floppy Drive High Density (FDHD), also called the SuperDrive. The same drive is used in the Mac IIx and Mac SE/30 and can be retrofitted to a Mac II. The disk-controller chip, called the SWIM (Super Wozniak Integrated Machine), allows the FDHD to read, write, and format 400K, 800K, and 1.4MB Macintosh 3½-inch disks. Using the Apple File Exchange utility software, the drive also reads and writes MS-DOS 3½-inch disks formatted at 720K and 1.44MB.

The internal hard disk, if one is installed, must be a 3½-inch half-height disk. Full-height disks and 5¼-inch disks do not fit due to space limitations. These larger disks can be installed in a Mac II or IIx, which means that these machines can accommodate internal disks that are faster and provide larger storage capacities.

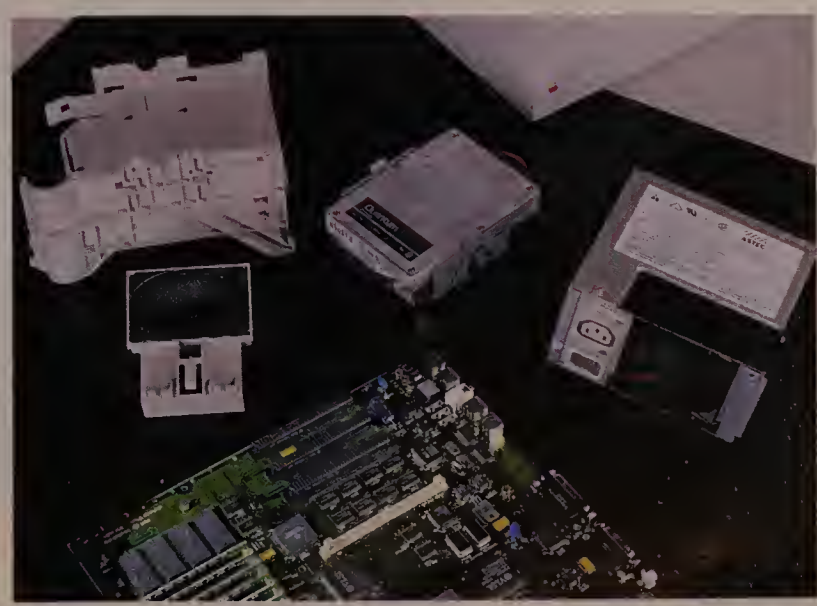


Inside the IIcx
By eliminating 3 slots and using only 3½-inch drives, the Mac IIcx saves deskspace—even when lying flat—in comparison to the wide-bodied Mac II and Mac IIx.

See How It Runs

Using a Mac IIcx for less than an hour—mostly to conduct benchmark tests—didn't give me much of a feel for the machine's performance. But the benchmark tests provide some clues. "Speed Tests" graphically presents the results of the benchmark tests and describes the tests in detail. Keep in mind that these benchmarks only provide a rough indication for comparing performance. Actual results may vary depending on the way you use your computer, the configuration, and a number of other variables. The tests are useful for spotting relationships and patterns, not for making a definitive product evaluation.

A Mac IIcx virtually ties the performance of a Mac IIx and a Mac SE/30. No surprise there, considering all three models have a very similar hardware architecture. As you'd further expect, a Mac IIcx is enough faster than a Mac II that you'd notice the difference in some activities but not in others. The new machine handily beats the socks off a Mac SE or Mac Plus.



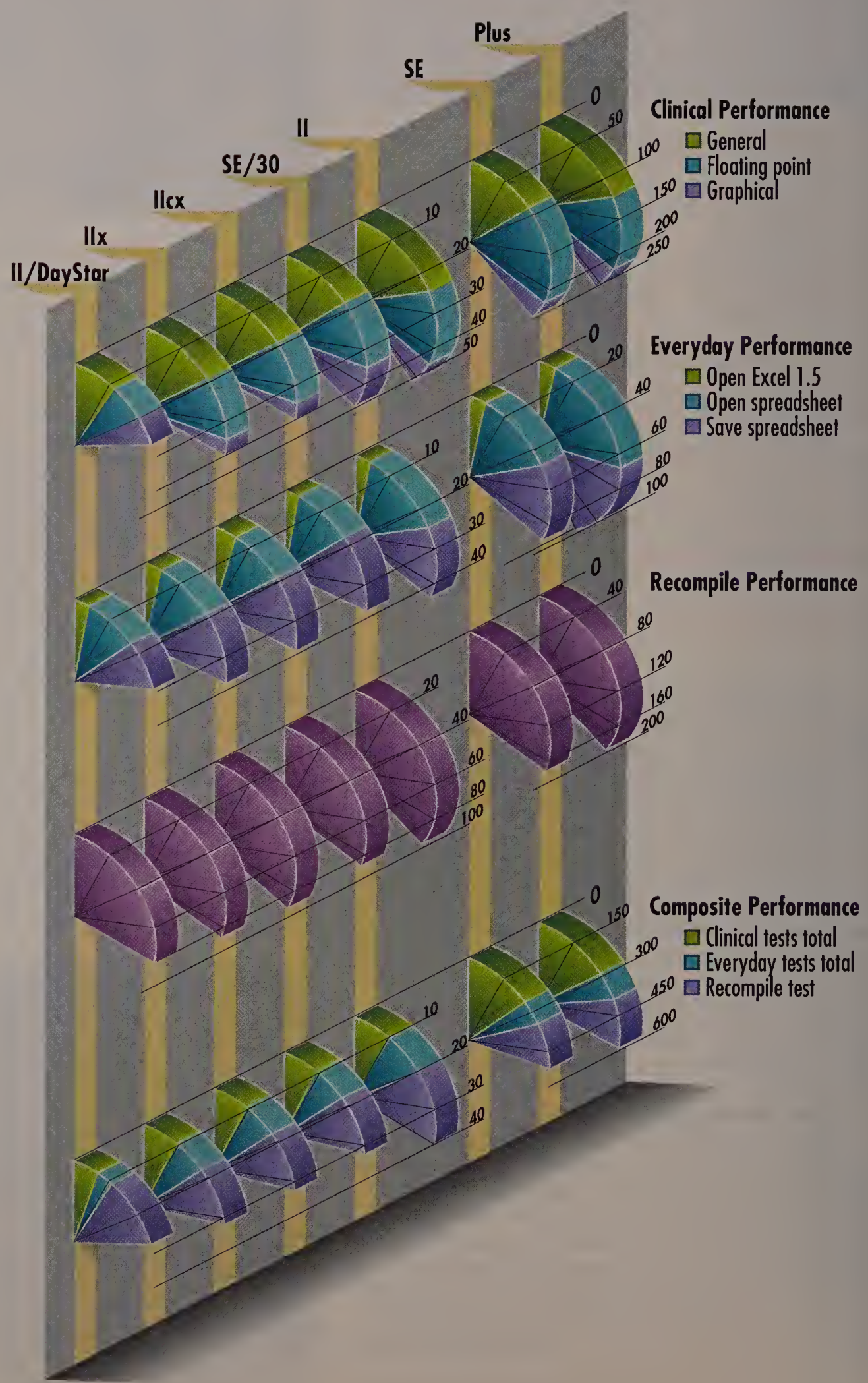
Five Easy Pieces
The IIcx disassembles quite easily, but remember, internal modifications abrogate Apple's generous 90-day warranty. Clockwise from the case, the interior components shown include the power supply, logic board, speaker, disk-mounting bracket, and hard disk.

Speed Tests

Benchmark tests don't lie, but neither do they tell the whole truth. Each test tells a specific truth about part of the performance picture. You and I must connect the dots of truth to see the whole picture, hoping there are enough dots to get it right. Here for your viewing pleasure are the results of seven benchmark tests designed to reveal performance trends among the six standard Macintosh models and the fastest Mac alive, a Mac II with a DayStar 33/030 Accelerator II.

All test computers had 2.5MB or more of RAM (none of the tests could use more than 2.5MB of RAM) and were started up from the same 30MB hard disk. The System Folder contained System 6.0.3 and Finder 6.1 but no start-up documents (INITs). MultiFinder was not used and the RAM Cache was off. Where applicable, color was off and the gray levels were set to 2 (1 bit per pixel). The DayStar 33/030 accelerator board had a 68882 numerics coprocessor. Variations in hardware and software configuration can markedly affect the test results, particularly for tests that measure everyday performance.

The chart "Clinical Performance" plots the results of several abstract laboratory benchmark tests. The General benchmark is the sum of the times for three tests: the standard Sieve of Eratosthenes (100 iterations), a selection sort on 1000 seven-character text strings that were in reverse order, and the multiplication of two 64-by-64-integer matrices. The Floating Point benchmark adds the results of two floating-point (decimal-number) tests. The first performs 10,000 addi-

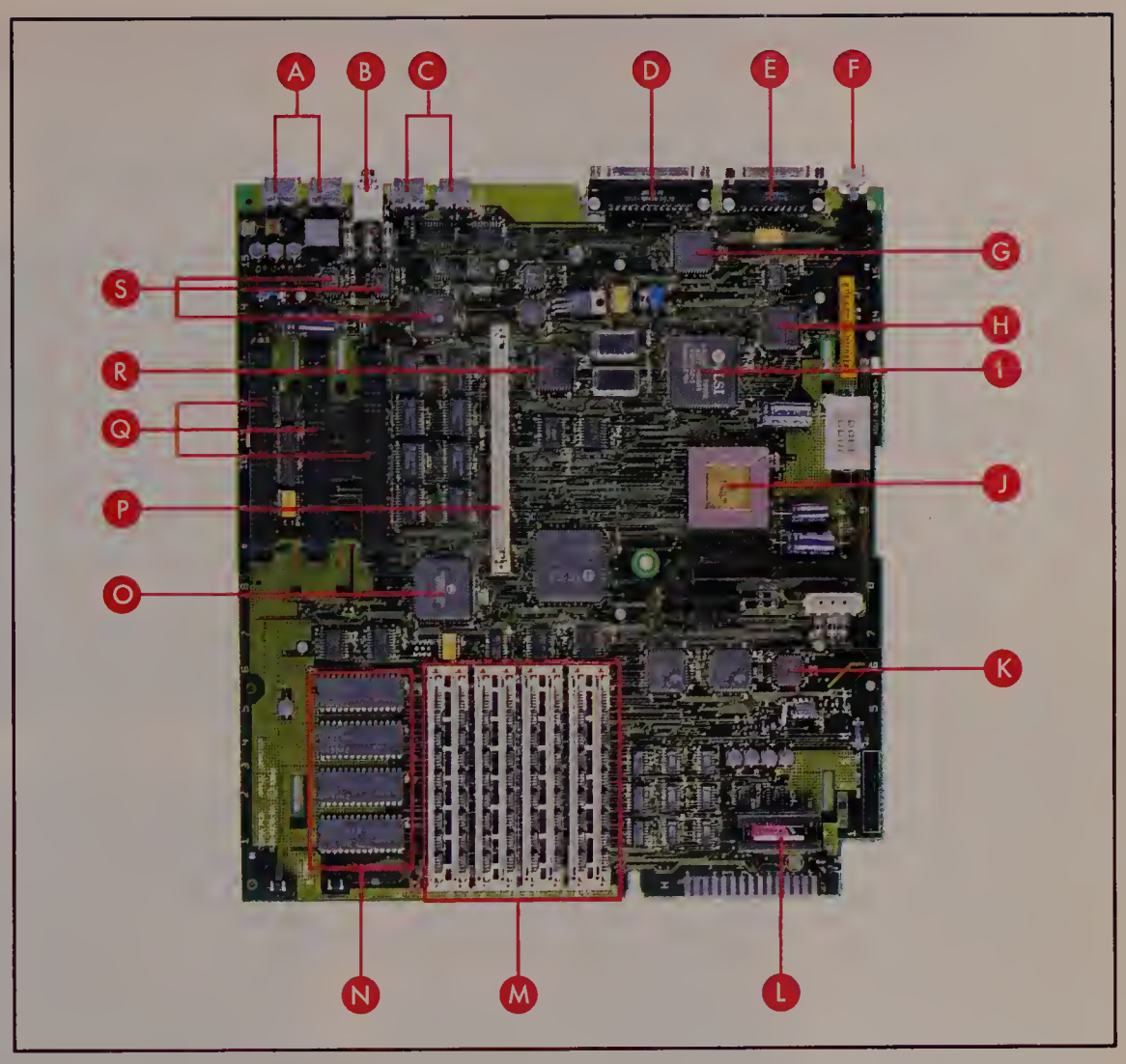


tions, subtractions, multiplications, and divisions. The second floating-point test, the standard Savage test, executes 1000 times a calculation involving the mathematical functions Tan( ), ArcTan( ), Exp( ), Ln( ), Sqrt( ); and also contains a multiplication and an addition. The Graphical benchmark measures the time it takes to draw 200 circles, each alternating black and white, plus the time it takes to draw 2000 squares, alternating black and white. A special application written by *Macworld* contributing editor Bruce F. Webster conducted and precisely timed all the clinical tests.

Although clinical tests are very accurate, they do not always directly relate to the real world. The chart "Everyday Performance" assesses how quickly the different Macintosh models accomplish typical tasks. It graphs the times (the average of three stopwatch timings) for opening Excel 1.5, opening a 235K spreadsheet in Excel, and saving that spreadsheet.

Another practical test of performance, though not one many people experience daily, is recompiling a computer program. The chart "Recompile Performance" compares times (again the average of three stopwatch timings) for TML Pascal II, running under the Macintosh Programmer's Workshop (MPW), to recompile all its unit interfaces (some 20 files).

The chart "Composite Performance" gauges overall performance by totaling the times of all the tests for each machine. It confirms what makes sense intuitively: a faster microprocessor makes a faster computer.



IIcx Logic Board

A) ADB ports
B) Audio port
C) Printer and modem ports
D) SCSI port
E) Floppy disk port
F) Lockable power switch
G) SCSI controller chip
H) SWIM chip
I) Main GLU (logic circuitry)
J) 68030 CPU
K) ADB controller chip
L) Replaceable battery
M) RAM SIMMs
N) ROM
O) 68882 FPU
P) ROM SIMM slot
Q) NuBus slots
R) Serial ports and AppleTalk controller
S) Sound chips

Make Your Choice

Macintosh pricing reflects the fact that Apple likes to classify its Macintosh products by cabinet design. The compact Macintosh products include the Plus, SE, and SE/30 (and formerly the original 128K and 512K). The modular Macintosh products include the II, IIcx, and IIx. Which of these will tempt you to flash your cash at an authorized Apple dealer?

A Mac Plus is the only answer if cost alone matters. Although the Plus has no internal expansion slot, third parties have devised boards and internal hard disks for it. The Mac SE is noticeably, but not startlingly, faster than the Plus. It's also more expandable, having an expansion slot, an internal hard disk mounting bracket, and a robust power supply to handle internal accessories better. You can install an accelerator board in an SE to make it as fast as, if not faster than, any standard Macintosh now on the market.

If the portability of a compact Mac is important to you, and you want the performance and longevity of Apple's latest technology at the lowest possible price, then you should select a Mac SE/30. Unlike a plain SE, an SE/30 has color QuickDraw built in, so you can easily add a color monitor.

An SE/30 may be as fast as a IIcx, but the IIcx has three NuBus slots and multiple postures to win your heart and justify its higher price tag. Although at 14 pounds the IIcx is the lightest-weight Mac, Apple doesn't market it as transportable because it isn't part of the compact line. Nevertheless, the IIcx is eminently

The II's Two New Displays

Apple has a reputation for crisp, distortion-free video monitors. Two new monochrome gray-scale monitors shown at the preview of the Mac IIcx appear to live up to that reputation. The Portrait Display shows one full page, and the Workstation Display shows two full pages, including the menu bar, a window title, and horizontal and vertical scroll bars. The pages can be 8½ by 11 inches or international size A4, vertically oriented. "Full-Page Portrait" and "Two-Page Landscape" show the two new Apple monitors.

The screen on the Workstation Display measures 21 inches diagonally and displays 1152 by 870 pixels at 77 dots per inch (dpi). The Portrait Display's screen measures 15 inches diagonally and displays 640 by 870 pixels at 80 dpi. For comparison, the Apple High-Resolution Monochrome Monitor that's been around for two years has a 12-inch screen that displays 640 by 480 pixels at a more standard 72 dpi.

Like Apple's smaller monochrome monitor, both new monitors can display true gray-scale shading. The amount of RAM on the monitor's companion video-display board determines how many shades of gray the monitor can display. The Portrait Display requires its own special video-display board, and so does the Workstation Display.

Ergonomically, both new monitors feature a high refresh rate of 75Hz to minimize flicker and eye fatigue. They also have flat screens with square edges for the least distortion and best focus near the edges. Both monitors come with 6-foot power cords so you can place them away from the Macintosh.

Full-Page Portrait
The Portrait Display has three ADB connectors; you connect one to the Macintosh and connect the keyboard and mouse to the other two, letting you place the system unit several feet from the keyboard and the monitor.

Two-Page Landscape
The Workstation Display has an etched screen to reduce glare and an integral tilt-and-swivel stand that lets you adjust the viewing angle.

Apple is also introducing three new video-display boards, all of them NuBus boards that fit a Mac II, IIx, and the new IIcx. Two of the boards go with the new monitors. Both of these boards include enough memory for 2 or 4 shades of gray (1 or 2 bits per pixel) and can be expanded with more memory for 16 gray shades (4 bits per pixel). The third board is for the 12-inch Apple monochrome monitor.

The board includes only enough RAM for black-and-white (1 bit per pixel) display and cannot be expanded for grays. The board and 12-inch monitor together provide—at the lowest cost for a Mac II, IIcx, or IIx—the same-quality display as the built-in screen on a Mac SE.

Exact prices were not final at press time, but should be $2600 to $3000 for the Workstation Display together with its video board, and $1300 to $1800 for the Portrait Display together with its video board. The Workstation Display should be available by the time you read this; the Portrait Display is scheduled to ship in May. The 1-bit video board for the 12-inch monochrome monitor is expected to cost $200 to $250.

Apple does not provide video boards that permit the use of either of the two new monitors with the Mac SE or SE/30. Conceivably, third-party vendors could provide SE video boards for these monitors.

transportable, say between work and home, if all locations have monitors. (Monitor prices start at $399.) Without a monitor—or with a flat-panel display—you can easily stow a IIcx under an airline seat. Unfortunately there aren't currently any flat-panel displays available for the IIcx (attention third-party developers). The IIcx also has more expansion options than the SE/30, thanks to the wealth of NuBus boards in existence. The operative word here is *versatile*. Apple president John Sculley and IIcx product manager Fred Benz often uttered it when they previewed the new machine to the press.

Paying the Price

Macintosh prices took a roller coaster ride last fall and winter, and Apple profits and stock prices followed along. Apparently still reeling from that trip to the midway, Apple marketing had not finally decided on prices or configurations for the Mac IIcx at the press preview. At that time Benz said the Mac IIcx price would be the same as, or less than, a comparably equipped Mac II. Sculley put it this way, "Three slots and a smaller footprint, or six slots and a larger footprint, are roughly comparable trade-offs. So the prices are going to be fairly comparable." Sculley also said the Mac SE/30 will continue as the lowest priced 68030-class Macintosh. The cheapest IIcx will therefore cost more than a stripped-down SE/30. This pricing philosophy will disappoint the many potential Mac II buyers who hoped Apple would take a smaller Mac II as an opportunity to offer them the real price break they've been wanting for so long. They may see a three-slot IIcx as more comparable in value to a one-slot transportable SE/30.

Apple is going to make a pile of money selling the Mac IIcx, and for good reason. Development costs had to be low compared to most other models because the IIcx borrows so heavily from other models. In addition, manufacturing costs have to be among the lowest for any Macintosh. I suppose the price has to be high to fit with the rest of the product line and to fit with Apple's image as the Häagen-Dazs of personal computers.

Which Mac II?

Based on Apple's fabulously vague price positioning, the Mac IIcx should easily finish cooking the Mac II's goose, a job begun last October by the Mac IIx. Although Apple will continue to make the Mac II "as long as demand warrants," there seems little reason to buy one. Anyone who needs more than three slots surely needs 4MB of RAM, and at this writing, a 4MB Mac IIx is a better deal, with or without a built-in hard disk, than an equivalently equipped Mac II. According to Apple, the vast majority of Mac II and IIx users only fill one or two slots. Without a doubt most of these users would pick a Mac IIcx over an equivalently priced Mac II. To keep the Mac II alive, Apple must lower its price or at least not introduce a bare-bones IIcx. Otherwise no one will buy a Mac II, once supply of the IIcx catches up with demand. Perhaps then we will see a drop in the price of a IIcx and an even steeper drop in the price of basic Mac II configurations.

In the meantime, the IIcx captures center stage in the Mac product line. Apple foresees the Mac IIcx's becoming a focal point for product evolution. Like the SE in the compact Macintosh product line, the IIcx will become a new design center within the modular Macintosh product line. Presumably you can expect to see new machines in the future based on the IIcx of today. What the upgrade paths will be to those new models only time will tell, but Apple has always tried hard to provide upgrades at what it considers a fair price. Demand for the IIcx will be high, because it is the Mac so many people have wanted for so long. It's reasonably compact, fairly quiet, expandable and versatile, fast, and for this month at least, the latest thing. □

See *Where to Buy* for contact information.

Behind the IIcx
The back panel of the Mac IIcx includes, from left to right, a floppy disk port, a SCSI port, two serial ports, an audio jack, and two ADB ports. Two of the cutouts in the upper right have been removed to access NuBus board connectors.

ED KASHI

Typical Mac IIcx User
As Apple's senior vice president of R&D and product marketing, Jean-Louis Gassée was in a unique position to influence the design of the computer he chooses to use in his own office.

Lon Poole is a Macworld *contributing editor and the author of* HyperTalk *and* Mac Insights, *both published by Microsoft Press.*

Picturing Statistics

Statistics programs that help you analyze numbers with graphics

by Charles Seiter

Over the last two decades, powerful new graphics-based ways of looking at data have evolved. In the last two years, Mac statistics software has matured in a way that capitalizes on this trend, and in the process has made the Mac a powerful force in statistics. The trend can be categorized as *exploratory data analysis:* a collection of graphing and plotting principles intended to make relationships between pieces of data stand out visually. Instead of crunching sets of numbers down into barely-more-informative statistical summary tables, the newer approach relies on a preliminary graphical inspection of data to determine which traditional computational methods show the most promise for interpreting the data.

The five statistical packages examined here—Data Desk Professional 2.0, Exstatix 1.01, StatView 512+, StatView SE+Graphics/ StatView II, and Systat 3.2—exemplify this trend. Aside from making these programs more useful than traditional calculation packages, this influence makes them fun to use, particularly compared to the mainframe statistics programs most people encounter in undergraduate courses. Each package has strengths and weaknesses in the main areas of interest to statisticians: education, economic analysis, market research, engineering, and science. One additional package, MacSpin 2.0, is covered separately because it is a special-purpose program.

StatView 512+

The most popular program to date, StatView 512+, from BrainPower, offers solid statistical analysis geared for the 512K Mac; the graphics are fairly limited by current standards. It's reasonably comprehensive and features a well-designed interface (see "StatView 512+"). Because of these virtues it has sold nearly 8000 copies. Abacus Concepts, the developers of 512+, sold the marketing rights for the program to BrainPower and then went on to develop StatView SE+Graphics and StatView II.

A look at "Vital Statistics" shows the basis of 512+'s popularity: it provides a lot of statistics for a reasonable price ($349.95). The program's main shortcoming is the omission of cluster analysis and time series analysis, but most of the tests offered by encyclopedic systems (for example, Systat) are present. 512+ is convenient for doing conventional 2-D plots—it supports the boxplots and cellulation techniques that formed the basis of early exploratory graphing methods—but it lacks the rotatable views of newer statistics programs.

Exstatix 1.01

The newest of these programs, Exstatix, by Select Micro Systems, can run on a 512K. Unlike StatView 512+, it offers color support on a Mac II and better windowing; its ANOVA (Analysis of Variance) capabilities are basic, but it offers rotatable 3-D views.

Exstatix supplements the standard tests found in beginning statistics courses with simple time series analysis. One of the program's particularly strong features is reporting: Exstatix prints summary reports, with explanations of the meaning of the tests, to a report window for convenient use in word processing documents.

Unlike StatView 512+, Exstatix does not explicitly support repeated-measures ANOVA. The selection of nonparametric statistics, on the other hand, is slightly more extensive than 512+'s.

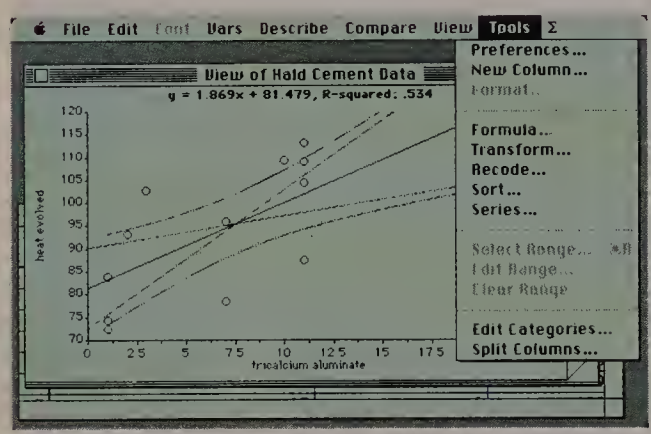
Exstatix also computes basic descriptive statistics and a variety of calculational intermediates. In practice, this means that most results are posted as fast as you can select a test, even for data sets consisting of several thousand records. This is especially important since Exstatix does not explicitly support the 68881, but only supports the coprocessor through SANE.

MARK HANAUER

Dr. William Bowen of Cal State Northbridge likes Exstatix's graphics and its smooth interface with Select Micro Systems' geography program.

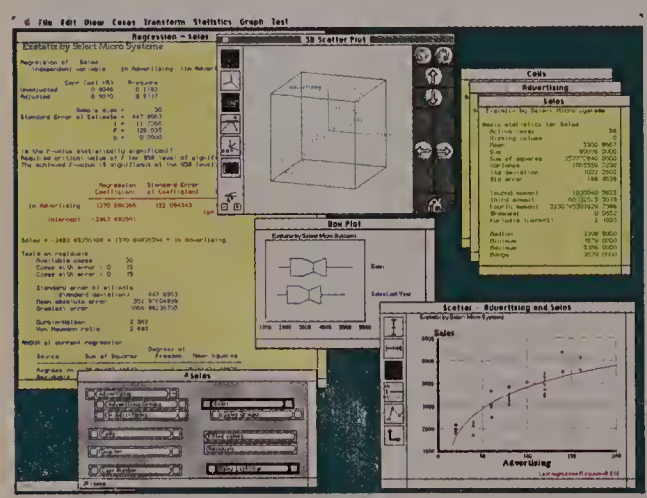
The program is compact enough to use under MultiFinder. It performed with no problem on a Mac SE with Word. A layout facility allows you to customize graphs; provides an overlay plane for text and legend material; allows axis scaling; and lets you choose data-point styles, line styles, and fill patterns. All graph features can be specified in color. Finally, Exstatix provides a 3-D scatterplot option (see "Exstatix") that amounts to a simplified version of MacSpin.

While Select Micro Systems has provided guidelines for adding user-developed tests, it has no plan to develop new tests of its own. The company is working with third parties on further test development.



StatView 512+

Along with the expected statistical tests, StatView 512+ offers a respectable array of facilities for transforming data and implementing database-like functions. This plot shows confidence limits in a simple regression analysis.



Exstatix

This image shows the usual data-table-and-report–style analysis, and also a rotatable 3-D scatterplot—in color. Exstatix runs on a 512K Mac, but takes advantage of the Mac II to produce a variety of elaborate color plots.

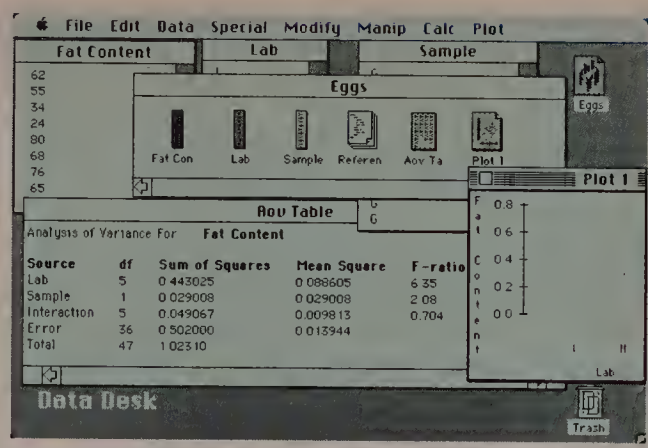
Vital Statistics

	Exstatix 1.01	Data Desk Professional 2.0	StatView 512+	StatView SE+ Graphics/II	Systat 3.2
List price	$349.95	$495	$349.95	$495	$595
Descriptive					
mean, standard deviation, minimum/maximum	●	●	●	●	●
frequency distribution, percentiles	●	●	●	●	●
Comparative					
paired, unpaired t	●	●	●	●	●
one-way ANOVA	●	●	●	●	●
complete ANOVA tables	●	●	●	●	●
n-way ANOVA	●	●	●	●	●
repeated-measures ANOVA			●	●	●
Sheffé test					●
Multivariate					
analysis of covariance		●			●
factor analysis		●	●	●	●
principal components			●	●	●
discriminant analysis					●
Regression					
linear	●	●	●	●	●
general nonlinear		●	●	●	●
polynomial	●	●	●	●	●
multiple linear	●	●	●	●	●
Correlation					
Kendall rank	●	●	●	●	●
Spearman rank-order	●	●	●	●	●
Pearson		●			●
Data manipulation					
functional express	●	●	●	●	●
spreadsheet-style editor	●		●	●	●
Cluster analysis					
hierarchical		●			●
single-linkage		●			●
complete-linkage		●			●
centroid-linkage					●
Time series					
autocorrelation	●				●
moving average	●				●
Box-Jenkins ARIMA					●
Fast Fourier transform					●
lin, nonlin smoothing					●
Nonparametric					
Wald-Wolfowitz		●		●	●
Mann-Whitney U		●	●	●	●
Kolmogorov-Smirnov		●	●	●	●
Wilcoxon signed-rank		●	●	●	●
Kruskal-Wallis		●		●	
Lilliefors					●
Goodman-Kruskal					●
Friedman	●		●		●
McNemar	●		●		
Cochran Q	●		●		

Data Desk Professional 2.0

The champion of exploratory graphics, Odesta's Data Desk Professional is the friendliest statistics program around; it sports several advanced test features (cluster analysis, for example) but offers only simple facilities for presentation graphics. This program is intended to improve your statistics knowledge as you work. Odesta has produced an exemplary three-part manual (Quickstart, Handbook, and Statistics Guide); no other package on the market is likely to be as useful to nonspecialists.

Besides the standard tests, Data Desk Professional includes facilities for examining the effect of individual data points on summary statistics. There is probably no other program with comparable ability to examine the impact of outliers or anomalous data points. Data Desk Professional was designed to use the concepts of Professor John Tukey, of Princeton University, who first advocated the idea that it is easier to see important correlations by looking at appropriate graphs than by inspecting numerical tables of correlations or ANOVA data. Thus Data Desk Professional best integrates exploratory graphics capabilities and encourages you to use a variety of plotting methods, including 3-D plots that can be rotated, sliced, brushed, and regrouped.



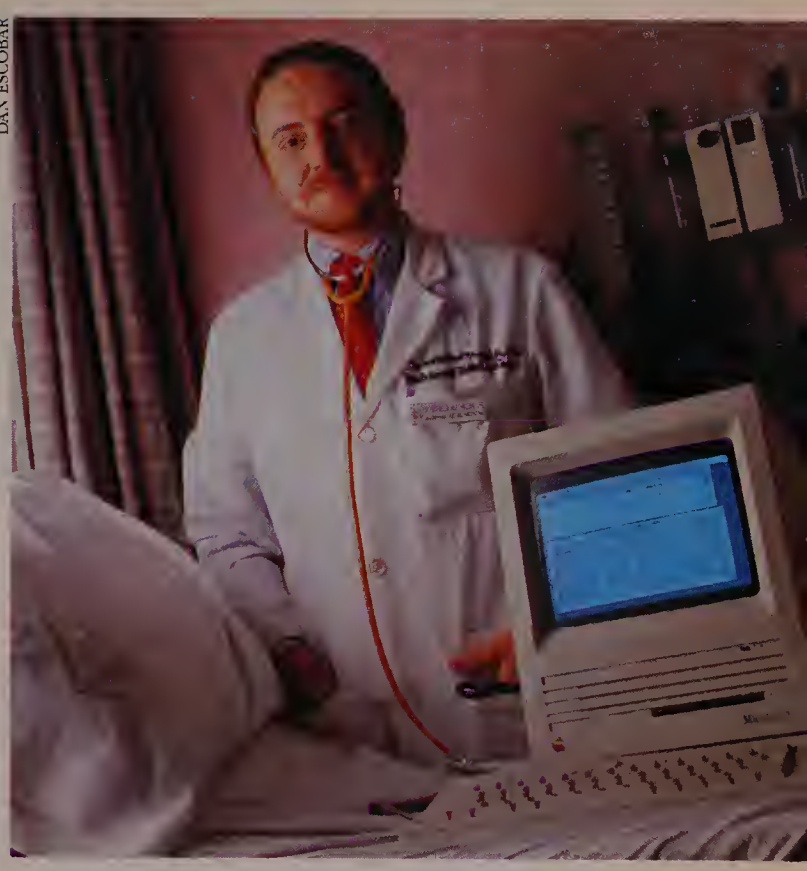
Data Desk

Data Desk Professional uses a flexible data representation (individual icons represent data fields as in Double Helix II). This figure shows a simple ANOVA analysis and a dotplot.

Data sets are stored in *work bundles,* which display icons for all the individual sets of data variables, transformed variables (these functions of data are typically "hot" and change automatically as data changes), and stored plots (see "Data Desk").

Selecting data by icon is faster and more convenient than scrolling through a list in a dialog box. To call up a scatterplot of one variable against another, you simply select the icons for the two variables in the work bundle window and choose Scatterplot from the Plot menu. When pressed, the HyperView button (a small triangle) in the resulting plot window suggests a calculation of correlation and regression statistics for your plot.

Odesta and Data Description (the program's developer) have done an outstanding job of producing a modern, graphics-oriented statistics package that is as useful to professionals as it is inviting to neophytes.



DAN ESCOBAR

Dr. Harold Holbrook of Stanford University Medical School uses StatView II to analyze research and patient data.

Presentation Statistics

	Exstatix 1.01	Data Desk Professional 2.0	StatView 512+	StatView SE+ Graphics/II	Systat 3.2
tables		●	●	●	●
scattergrams	●	●	●	●	●
matrix scatterplots					●
line charts		●	●	●	●
pie charts	●	●	●	●	●
bar charts	●	●	●	●	●
dotplots		●			●
boxplots	●	●	●	●	●
cellulation		●	●	●	●
stem-and-leaf plots		●			●
3-D histograms					●
sunflower			●	●	●
3-D scatterplots		●			●
rotatable 3-D views	●	●			
surface plots		●			●
label overlays	●	●	●	●	●

StatView SE+Graphics/StatView II

Abacus Concepts has taken Stat View 512+ and has added a professional presentation package that includes color support, upgraded data import/export, and math coprocessor use. It offers the same test menu as StatView 512+.

StatView SE+Graphics and StatView II are the latest results of the continuing evolution of StatView 512+. The main distinction between the new programs and StatView 512+ is the integration of presentation graphics (see "Statview SE+ Graphics and II"). All three programs offer the same statistical tests, and the StatView SE+Graphics package even includes the StatView 512+ manual in addition to its manual covering presentation graphics. The distinctions between SE+Graphics and II are math coprocessor support (II has it, SE+Graphics doesn't) and color (supported in both, but II's color palette is more extensive).

Statistics Software Overview

In addition to the programs featured in this article, there are several other statistics programs available for the Macintosh. Some of these provide general statistics capabilities and others are designed for specialized statistics applications.

Chipendale from True BASIC. A specialized social science statistics program for building tables and cross-tabulating data. List price: $49.95. Call 603/298-5655.

CLR ANOVA from Clear Lake Research. Designed for variance analysis, this versatile program can handle unequal sample sizes and up to ten factors. List price: $75. Call 713/523-7842.

MacSpin 2.0 from D^2 Software. In MacSpin 2.0, statisticians can look at clouds of data points rotating in 3-D, to see whether the points cluster in certain directions or regions, indicating a correlation or other relationship.

While it is not a statistics program as such, MacSpin 2.0 goes far beyond the capabilities of any other commercial program in this one area. Rotation is particularly fast and smooth, as MacSpin uses proprietary screen update routines that bypass QuickDraw. In MacSpin you can code data sets by color to indicate data subsets (including color coding values by user-defined ranges). MacSpin rotates surface plots or other line-connected data-point arrays and allows color selection for the grids and for the lines defining the surface. List price: $300. Call 512/454-7746.

MacSS from StatSoft. An older general statistics program, it was being extensively revised by StatSoft at press time and was unavailable for review. List price: $245. Call 918/583-4149.

Monte Carlo Simulations from Actuarial Micro Software. The leading professional statistics simulations package for engineers and actuaries (insurance statisticians), it covers in greater detail some of the same areas as the business programs Crystal Ball and Best Answer. MCS simulations can employ a large array of related random-variable distributions for rapid simulation of events whose outcome is difficult or impossible to simulate directly. List price: $595. Call 919/773-1313.

RATS from VAR Econometrics. RATS (Regression Analysis of Time Series) is an advanced econometric package used mainly for studying and predicting business trends. Besides simple regression and most possible types of data smoothing, it includes hypothesis-testing and modeling commands. RATS includes advanced time-series methods such as Box-Jenkins techniques for ARIMA models, nonlinear optimization, vector autoregression, and forecasting. Offers spectral analysis (for use on synthesized complex series) with Fourier transforms and inverse Fourier transforms, and a few windowing functions so the package could be used for some scientific and engineering applications in a pinch. List price: $300. Call 312/864-8772.

StatCalc from Clear Lake Research. A HyperCard-based statistics calculator, StatCalc includes descriptive statistics, t- and F-tests. List price: $22.50. Call 713/523-7842.

Statistics for Excel from Heizer Software. A specialized set of Excel macros that covers regression, *n*-way correlation, ANOVA (1-way with repeated measures, or 2-way single-observation), and simple nonparametric statistics (Mann-Whitney U). The macros also compute familiar distributions and functions (normal, chi-square, F). List price: $79. Call 415/943-7667.

Statistics Modules from Lionheart Press. Modules are available for ANOVA, time series, econometrics, regression analysis, and several types of business statistics. List price: approximately $100 for most modules. Call 514/933-4918.

TrueSTAT from True BASIC. A basic statistics "construction kit" for students, with simple tests that can be extended by programming with BASIC-style commands. List price: $49.95. Call 603/298-5655.

The Graph menu contains most of the new features of SE+Graphics and II. The original StatView's graph types have been upgraded to allow detailed control—through long hierarchical menus—of point type, line width, shading, chart scaling, and fill patterns. You can overlay legends and other text (with arrows connecting text to points of interest in a plot), and insert tables directly into a graph. The organizing principle for chart modification is the separation of each graphic into four superimposed planes: Background, Statistics, Drawing, and Legend. In both programs you can control the artwork on each plane to design your data presentation for maximum impact.

The Import command in 512+'s File menu has been enhanced in SE+Graphics and II with a background program that evaluates imported data intelligently. For example, you can bring an Excel file into SE+Graphics or II, and those programs automatically distinguish variables from categories and assign correct variable names.

Systat 3.2

Systat, from Systat Inc., is the only Mac product that is nearly equivalent to large mainframe packages (BMPD, SPSS). It offers a truly comprehensive array of statistics and monochrome graphics; but its use of command lines rather than Mac-style menus makes it hard to learn.

While the StatView programs are easy to use and visually powerful, Systat is comprehensive. Every test in standard undergraduate statistics textbooks can be found in some module of Systat. If you need a test that isn't there, such as Cochran's test or Mantel-Haenszel, Systat includes its own version of BASIC for programming that function yourself.

Systat's breadth and its compatibility with PC and minicomputer programs are reasons for choosing the program. Despite a wonderful manual that incorporates Leland Wilkinson's informative views on statistical practice, Systat takes effort to use. It retains the command-line style of its non-Mac predecessors. The authors of Systat correctly point out that for performing repetitive data processing, rather than exploratory analysis, this method is significantly more efficient than using icons and menus (see "Systat").

Version 3.2 introduces two significant advances toward an improved Mac interface. First, Systat now features a data-management system that supports the usual cut, copy, and paste functions. Second, the View window now allows you to plot a set of graphs and page through them on screen. The extensive facilities (including excellent 3-D plotting) that were offered piecemeal in earlier versions are now notably more manageable with the addition of the View window.

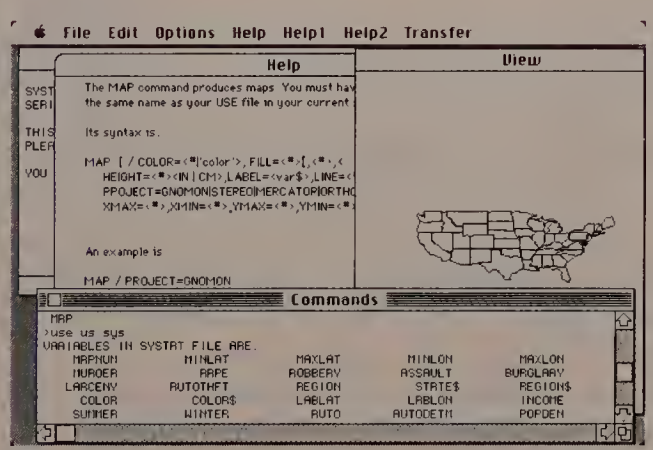
Systat also includes a demo program, Mystat (available separately for $3), that shows Systat's planned interface for future versions. Mystat has a complete interactive Macintosh interface, with nearly complete graphing features, icon menu choices, and a basic assortment of statistics. Fastat, a more elaborate program with a business statistics emphasis, is being developed to bring Systat's power to more people.

MARK HANAUER

Dr. Chris Nardo of Immunetech Pharmaceuticals uses Systat for tracking and analyzing results of experimental drug testing programs.

StatView SE+Graphics and II

The plots (polynomial regression, notched box-plot) in StatView SE+Graphics and StatView II are the same as those in StatView 512+, except that Abacus Concepts' upgraded program enables you to manipulate the plotted image.



Systat

Though Systat's Map function is sophisticated, allowing selection of regions and expression of data, effective use of Map demands that you master a fussy command-line syntax.

The Final Analysis

All five programs reviewed in this article are easier to use, better at output graphics, and better at exploratory analysis than any program was—for any computer in the world—four years ago. Systat is probably the leading program for academic statistics, StatView SE+Graphics and StatView II are the business graphics leaders, and Data Desk Professional leads in exploratory statistics, but it should be noted that the old standby StatView 512+ and newcomer Exstatix offer impressive arrays of facilities for their modest prices. The developers of these packages, in fact, tend to openly admire each other's work, hoping to capture a particular market segment rather than dominate the field. All of these programs incorporate trends in analysis that make statistics more accessible, and it all adds up to good news for the Mac. □

See *Where to Buy* for contact information.

Charles Seiter is a chemistry-professor-turned-computer-writer and a Macworld *contributing editor. He's written several books on programming languages and financial modeling.*

Ten Ways to Speed Up a Mac

Here's a list of bottleneck symptoms and solutions that can help you cure a sluggish Macintosh

by Lon Poole

When it comes to speeding up the Mac, you have lots of choices. Leaf through the ads in this issue and you'll see accelerator cards, memory, fast disk drives, and software to boost performance. You could buy each type of enhancement or you could spontaneously pick a few, but either approach would probably waste your money. This article helps you decide which types of enhancements to get, and in what order to get them. Some solutions make your working habits more productive; others physically speed up your system.

Strained Floppy Disk Drives

Nothing slows you down faster than running out of disk space. With today's burgeoning System software, application programs, and documents, it's easy to strain two 800K floppy disk drives. You need higher disk capacity if you observe any of the following symptoms.

- Bouts of disk swapping punctuate your work on any but the smallest documents, or when you cut and paste between applications.
- Your floppy disks multiply at a rate that would astonish bacteria in a petri dish.
- Start-up disks never have enough space for the fonts you want or for utility software such as desk accessories, Control Panel devices, and INITs.

Rx Hard Disk Drive

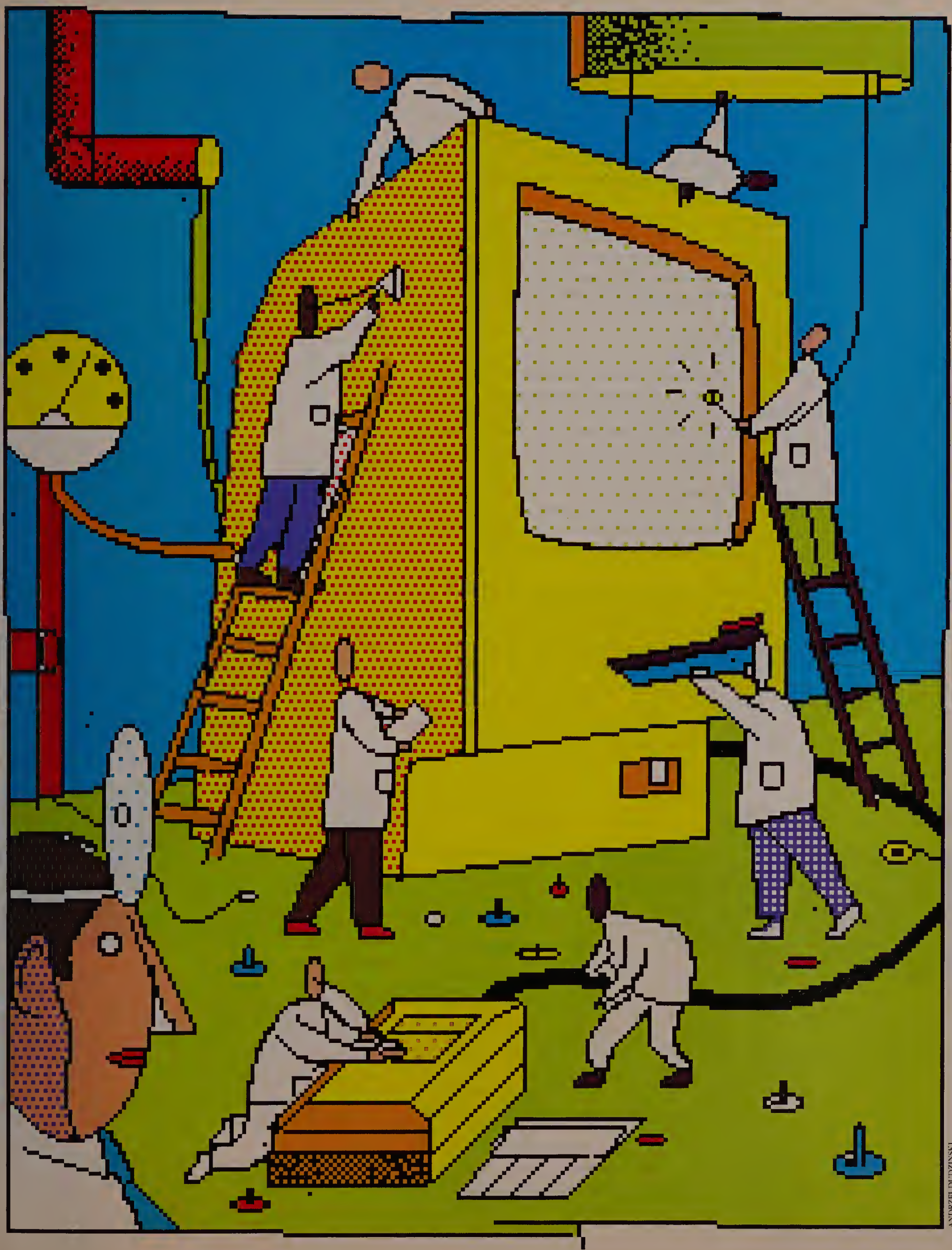
To eliminate disk swapping and speed up the time it takes for the Mac to access data, use a hard disk drive. (see "Disk Drive Performance"). Hard disks range in capacity from 20 megabytes (the equivalent of 25 floppies) to 600MB and more. Drives that attach to a Mac's SCSI port are significantly faster than ones that attach to the Mac's external disk drive port. For example, an Apple Hard Disk 20 is not much faster than an 800K floppy disk. (You can upgrade a Hard Disk 20 so that it uses the Mac's SCSI port with Personal Computer Peripheral's HD-20 WSI adapter kit.) If your 128K or 512K Mac doesn't have a SCSI port, your dealer can install a SCSI adapter.

Rx RAM Cache

You can boost the speed of any disk drive by turning on the RAM Cache option of the General device in the Control Panel. If your Control Panel doesn't have a RAM Cache setting, then you need to update your System software to version 2.0 (System 4.1 and Finder 5.5) or later. The cache uses part of the Mac's random-access memory (RAM) to keep a copy of information the Mac recently accessed from a disk. Should the Mac need the same information again, it can retrieve the information more quickly from the cache in memory than from the disk. If the Mac needs information not in the cache, it gets it from disk and leaves a copy in the cache, replacing the stalest information there.

Gauging the efficiency of the RAM Cache is largely a matter of feel. You can put a stopwatch to simple tasks, such as opening a document from the Finder and immediately quitting (see "Open and Quit with RAM Cache"). However, such tests don't measure cache efficiency during real work. Actual efficiency depends on what applications you use and how you use them. Apple recommends you use no more than 25

Lon Poole answers readers' questions and offers advice in his monthly Macworld *column. Many of the tips he's compiled can be found in his book* Mac Insights *(Microsoft Press, 1987).*

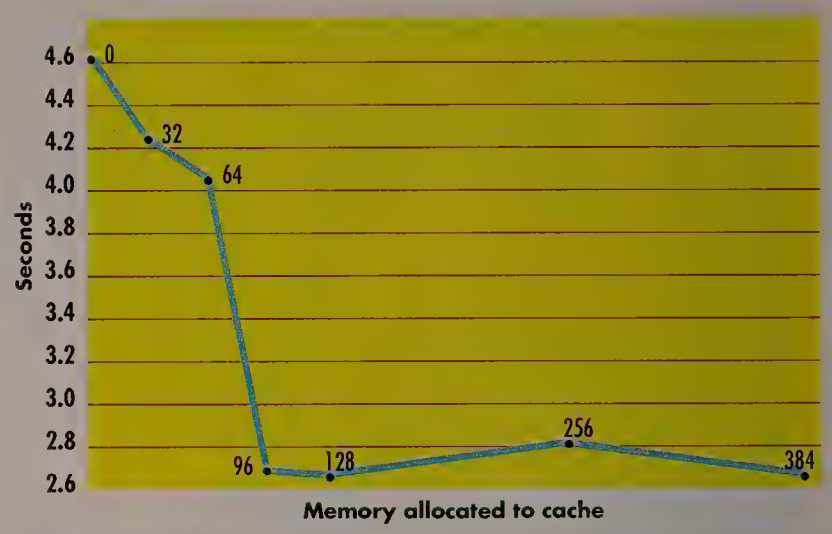


ANDRZEJ DUDZINSKI

percent of the total available memory (for example, 256K on a 1MB Mac).

The best measure of cache performance is the percentage of disk requests filled from the cache. Apple's RAM Cache doesn't provide that information but Turbo Cache, a replacement cache included with disk drives from PLI, does report an efficiency percentage. By watching the percentage while you work with lower and lower memory settings, you can determine a minimum setting that's most efficient for you.

RAM Cache is not effective with all applications. HyperCard, for one, has its own internal caching scheme. Always follow any specific directions in an application's manual regarding RAM Cache use.



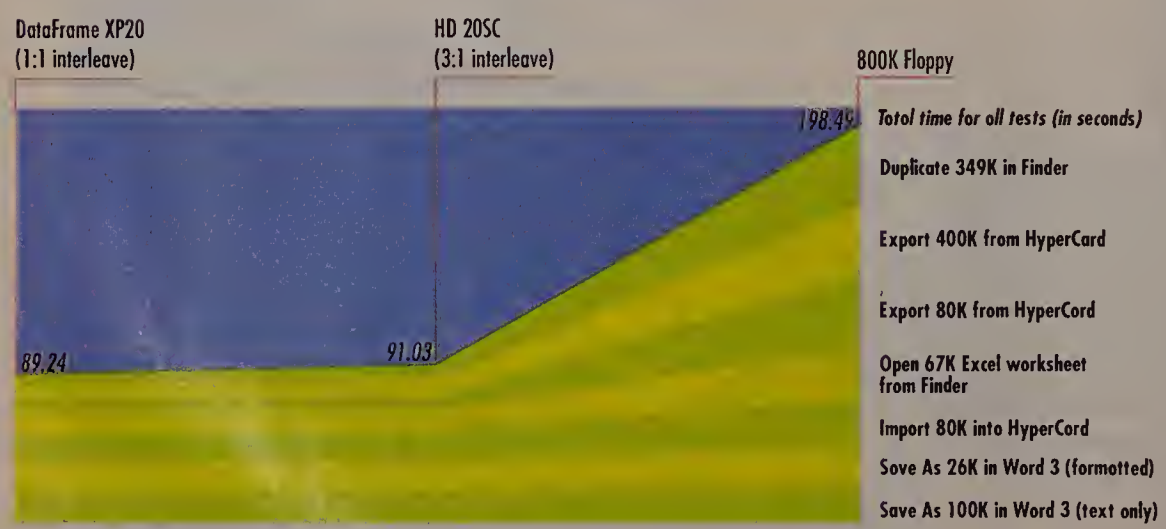
Open and Quit with RAM Cache

The efficiency of a RAM cache increases as you assign more memory to it, until you reach 25 percent of the total memory. Here the cache was tested by opening a MacDraw document from the Finder and quitting immediately without using MultiFinder. Tests were performed on a standard Mac Plus with an Apple Hard Disk 20SC.

Rx RAM Disk

Another method for reducing disk activity is to use some memory as a mock disk drive, called a *RAM disk*. RAM disk software usually requires you to put a file in the System Folder. Commonly this file contains a copy of some or all files from the System Folder of the start-up disk, because those files contain fonts, desk accessories, and many other software resources used by almost all applications. A RAM disk large enough to significantly improve performance is usually 600K or larger. In today's world of memory-hungry applications, allocating memory for a RAM disk can be a real sacrifice.

RAM disks have a major limitation. Whatever you save on them has no permanence unless you also save it on a conventional disk. When the power goes, so does the RAM disk. You can buy external RAM disks. They have the performance of a conventional RAM disk but contain their own memory. Also, they have battery-power backup so you don't have to worry too much about losing information. But if they only connect to an external disk drive port, then you can't use them with a Mac II.



Disk Drive Performance

The two SCSI hard disk drives in this test proved seven times faster than the floppy disk drive for simple transfer of data to and from the disk, such as reading or writing a text file from HyperCard. The hard disks were about 150 percent faster than a floppy disk at more complex tasks, such as opening an Excel worksheet. Some tasks, such as saving new documents in Word, were only 25 to 50 percent faster with a hard disk.

Hard Disk Languor

Hard disks have a few diseases, all of which impede the transfer of information to and from the disk. You may be right if you think your hard disk has slowed down over the last few months. There are several steps you can take to bring a sluggish hard disk up to speed.

Rx Reformat

A hard disk drive operates at peak efficiency only if it is formatted for the specific Macintosh model to which it is connected. Formatting a drive establishes its *interleave ratio;* that is, the number of disk revolutions required to read or write all the information on one track of the disk. The fewer the revolutions, the faster information can be transferred to or from the Macintosh.

All hard disk drives can read or write an entire track in one revolution, which is an interleave ratio of 1:1. A Mac II can keep up with the data-transfer rate resulting from a 1:1 interleave ratio. However, a Mac SE's SCSI port has a slower data-transfer rate and requires a 2:1 interleave ratio (two disk revolutions to read or write an entire track). A Mac Plus or a Mac 512K with a SCSI adapter requires a 3:1 interleave ratio (three disk revolutions per track).

Some disk manufacturers—including Jasmine, SuperMac, and CMS—have developed special software that enables a Mac SE or a Mac Plus to work with the optimum 1:1 interleave ratio. For simple data transfer, SuperMac's XP20 tested 40 percent faster using a 1:1 interleave ratio on a Mac Plus. But when opening, saving, and doing other complex tasks, the 1:1 interleave ratio seems to have no advantage on a Plus.

A mismatched interleave ratio reduces hard disk performance drastically. For example, a drive with a 1:1 interleave ratio effectively has an interleave ratio of 17:1 when connected to a Mac Plus, because the drive must go around the block several times while waiting for the Mac to be ready for another block of information (see "Improper Interleave Format").

Rx Remove Fragmentation

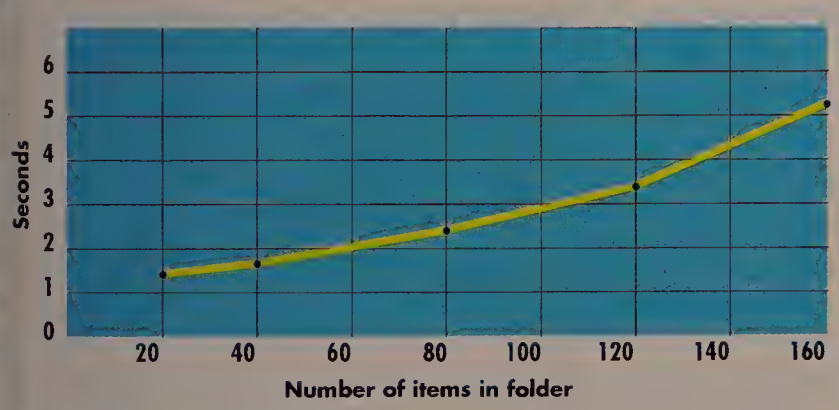
All hard disks eventually suffer from file fragmentation. A fragmented file is one that is scattered in little pieces across the disk instead of being located in one continuous segment. Fragmentation slows disk performance by forcing the drive to shop all over town instead of going to one store.

Fragmentation is usually at its worst when a disk is nearly full and you've been deleting and adding to it for months. The effect on disk performance becomes noticeable when about 10 percent of the files are fragmented. You can determine the percentage of fragmented files with utility software such as Disk Express or the HD Tuneup feature of the Symantec Utilities.

To consolidate fragmented files, you can back up all files one by one, reformat the disk, and restore the files from the backup. Or you can fix fragmentation without reformatting by using Disk Express or HD Tuneup. You still need a backup, however, in case something goes wrong during consolidation.

Rx Rebuild DeskTop File

If you use a large hard disk containing thousands of files, you may notice the Finder slowing down. Copying a 5K file to the hard disk may take minutes instead of seconds. The Finder slows down when its invisible DeskTop file gets too large. The DeskTop file tracks housekeeping information such as the position of icons in windows and Get Info comments.



Time to Open Folders

The fewer the number of items in a folder, the faster the Finder opens the folder. Leaving folders with numerous files open also slows down the Mac whenever you restart or close an application.

Improper Interleave Format

To see how severely an incorrect interleave ratio reduces hard disk speed, I formatted an Apple Hard Disk 20SC on a Mac II (at 1:1 interleave) using Apple's HD SC Setup utility. Then I tested it on a Mac Plus. The drive operated much slower than if it were formatted for the Plus (at a 3:1 interleave ratio).

You can tell when the DeskTop file has become swollen by watching the messages in the progress monitor box while copying or duplicating a file. If you get the message "Updating the desktop file ... ," you should rebuild or compress the DeskTop file.

To rebuild a DeskTop file, press Option-⌘ when you start up the Mac or when you quit an application while not using MultiFinder. Rebuilding a DeskTop file loses all comments you have typed into Get Info boxes. Comments automatically provided by applications are not lost.

You can compress a DeskTop file without losing your Get Info comments using Disk Express. For an experimental solution to the problem, see "Experimental Speed." To really solve this problem, Apple needs to improve the Finder's handling of the DeskTop file.

Rx Reorganize

What appears to be a slow disk drive may actually be inefficient file and folder organization. My tests show that the Finder takes almost four seconds more to open a folder containing 160 items than one containing 20 items (see "Time to Open Folders"). If you leave any such folders open, the Finder takes the extra time every time you start up the Mac or quit an application while not using MultiFinder. You can leave full folders closed, or you can move some of the documents and applications in them to other folders. For faster Finder operation, use nested folders and keep the number of items in each folder to 50 or fewer.

Printer-Induced Coma

Adding a hard disk drive won't make an ImageWriter or LaserWriter print faster. After you click OK in a Print dialog box, the Mac waits comatose, trickling pages to the printer and leaving you ample time to get thoroughly distracted before you can get back to work.

Experimental Speed

A little over a year ago some adventurous users discovered they could eliminate the Finder slowdown caused by Desktop file congestion. First they copied the Desktop Manager file from an AppleShare file server or the AppleShare System Installer disk to the System Folder on every start-up disk. Next, they restarted without MultiFinder, started an application, and used a desk accessory such as Disktools Plus to delete the invisible Desktop file from all the disks to which they copied the Desktop Manager file. Again they restarted their Macs, pressing ⌘-Option. The Desktop Manager created two invisible files to take the place of the Finder's invisible Desktop file.

Several repercussions have come to light about using the Desktop Manager to speed up the Finder. For one, applications or desk accessories that rely on the Desktop file to start other applications—Finder replacements, for example—will no longer be able to do so. Their other abilities should be unaffected, however.

In addition, the Desktop Manager opens two files from each disk the Finder sees, and it leaves them open until you shut down or restart the Mac. Therefore you cannot dismount hard disk partitions or eject removable hard disk cartridges unless you use the MountEm FKey (available on CompuServe). You may also have trouble using disk utility applications or restoring a disk with a backup application. If so, make the utility the start-up application and restart the Mac.

Lastly, the Finder may be unable to find the application to open a document when you double-click on the icon. You should be able to cure this problem by dragging the application into the folder that contains the document you want to open, opening the document, quitting, and then returning the application to its original location.

Note: It's important that you put the Desktop Manager file in the System Folder of every start-up disk. If you just do some disks, eventually you'll end up with both the Desktop Manager's two invisible files and the Finder's invisible Desktop file. One or the other set of files will be incomplete, and you could end up effectively scrambling your disks.

Warning: Apple doesn't authorize or support using the Desktop Manager except on an AppleShare file server. Nor does *Macworld* endorse the technique, although it is presented here in good conscience. You use it entirely at your own risk. Although many people have used the technique successfully for over a year, you could be the first to lose the contents of a hard disk.

Use a Print Spooler

Print spooler software (also called background printing software) intercepts page images on their way to the printer and saves them quickly on disk—preferably a hard disk. Then whenever you leave the Mac idle (for instance, between keystrokes), the spooler software sends the saved images as the printer is ready. The only side effects are sporadic brief delays in mouse or keyboard response.

Apple includes background printing software for the LaserWriter with MultiFinder. But you can buy a better spooler that works with an ImageWriter, a LaserWriter, or an AppleTalk ImageWriter. SuperLaserSpool saves page images to disk faster than Print Monitor (the spooler that comes with MultiFinder) and is less obtrusive about sneaking time to send spooled page images to the printer. In addition, since SuperLaserSpool does not require MultiFinder, you can use it on Macs with only 1MB (see "Waiting to Print").

Memory Deficiency

Additional memory speeds up the Mac by reducing its dependence on relatively slow disk access. When a Mac runs low on memory, it purges currently unneeded items—fonts, dialog box contents, software segments, document fragments—and replaces them with needed items from disk. The more memory available to an application, the less often the Mac must fetch items from disk. Additional memory also allows you to allocate a larger RAM cache and to use MultiFinder.

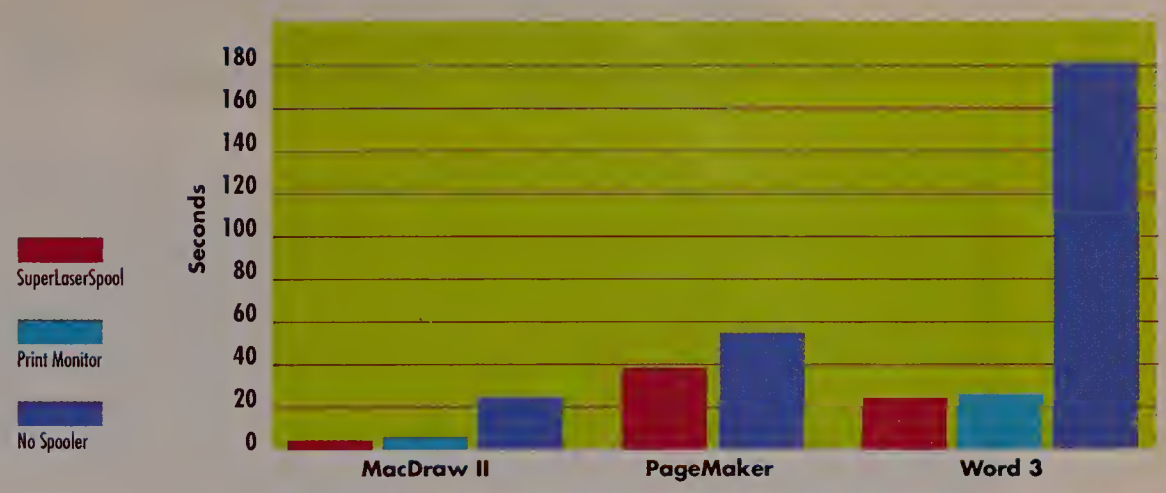
Add SIMMs

Adding more memory to a Mac Plus, Mac SE, or Mac II is simple: replace 256K SIMMs (Single Inline Memory Modules) with one or more 1MB SIMMs (see "Room to Grow" in the March 1988 issue of *Macworld,* and "Installing Memory" in the May 1988 issue). When you buy SIMMs, pay attention to their memory access

times. A Mac II requires 120-nanosecond memory, whereas a Mac SE or a Mac Plus can use slower and cheaper 150-nanosecond memory. Using faster memory than required does not improve performance. If you buy 120-nanosecond memory for a Mac Plus or a Mac SE, however, you can take it with you should you later trade up to a Mac II.

Make sure you buy SIMMs that physically fit with any other accessories installed inside the Macintosh. Apple's SIMMs have memory chips soldered directly to the SIMM, a process called *surface-mount technology*. Because surface-mountable memory chips have been scarce and expensive, some SIMM suppliers use memory chips inserted in sockets that are soldered to the SIMM. SIMMs with *socketed* memory are taller than surface-mount SIMMs and may collide with adapter cards in a Mac SE and with some internal hard disks in a Mac II.

If you have a Mac 128K or a Mac 512K, you can increase its memory to 1MB or more using a variety of products, including adapter cards, upgrade kits, and logic board swaps.



Waiting to Print

Printing with a print spooler frees the Mac 28 to 84 percent faster than printing directly to a LaserWriter IINT. A print spooler such as SuperLaserSpool is slightly faster than the Print Monitor that comes with the System. In my tests, however, Print Monitor (running on a 1MB Mac Plus) couldn't spool at all from PageMaker and couldn't print after spooling from MacDraw II due to lack of memory. SuperLaserSpool had no such trouble.

Slow Processor

If you still want faster performance after installing a SCSI hard disk, print spooler software, and more memory in your Mac, perhaps your Mac's standard processor is not fast enough. The following symptoms suggest that the Mac is processor-bound:

- Slow scrolling (without disk activity)
- Slow redrawing of windows and graphics, especially with complex drawings, large screens, color screens, or screen extender software
- Slow printed-page imaging or pagination
- Slow recalculation of spreadsheets
- Slow cut-and-paste of large selections

Rx Install Accelerator

To increase processor speed, you must install a more powerful processor and perhaps a math coprocessor. The standard processor on a Mac 512K, Mac Plus, and Mac SE is a Motorola 68000 running at a clock speed of about 8 MHz. You can add an accessory card that contains a replacement 68000 processor running at about 16 MHz to any of those Macs. Doubling the clock speed doubles the speed of screen redrawing, calculations, and other activities that keep the processor busy. But communications with disk, keyboard, mouse, and serial ports take place at the slower rate. The task at hand may degrade the theoretical 100 percent performance increase to 20 percent or less.

You can also accelerate a Mac SE by transplanting the Mac II's 68020 processor and 68881 math coprocessor. A 68881 speeds math-intensive tasks—not just spreadsheets and statistics but graphic transformations such as 3-D rotations as well. (Most 68000 accelerator cards also include a 68881 as an option.) If you want to speed up a Mac II, you can replace its 68020 processor and 68881 coprocessor with the 68030 board.

Replacing the standard processor with a faster one improves overall system performance, but the degree of improvement varies greatly among different applications. For example, applications that rely heavily on disk access show less improvement than those that spend more time calculating and manipulating information in memory. Also, installing a faster processor doesn't make up for slow disk drives or too little memory. Don't bother accelerating the processor unless you already have a SCSI hard disk drive and more than 1MB of memory.

The Proper Treatment

Your Mac probably exhibits symptoms of several of the problems described here. If so, treat one condition at a time and reevaluate overall performance after each treatment. Start with disk drives. If you don't already have a SCSI hard disk, get one at least 50 percent larger than you think you need. If you have one, make sure it's performing at its best—no fragmentation or distended DeskTop file. Try using a RAM Cache. Definitely use print spooler software. Next, add memory to bring the Mac up to at least 2MB, 4MB if possible. If all else fails to achieve the performance you want, install an accelerator card. Stop upgrading when you're satisfied with the Mac's performance (or when you run out of money). □

See *Where to Buy* for contact information.

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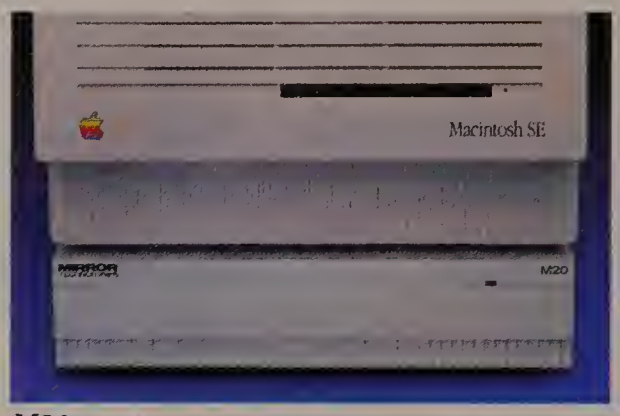
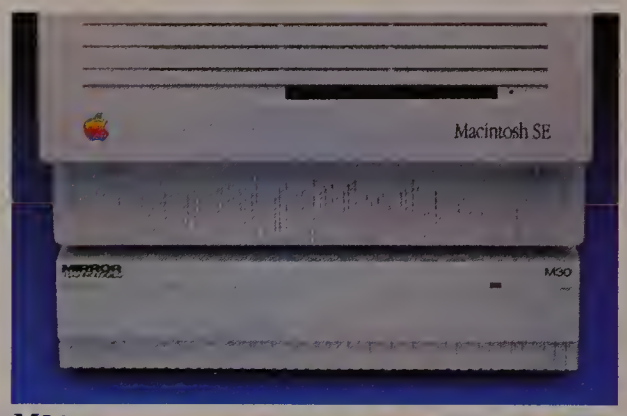


M20 20 Mb External

$527

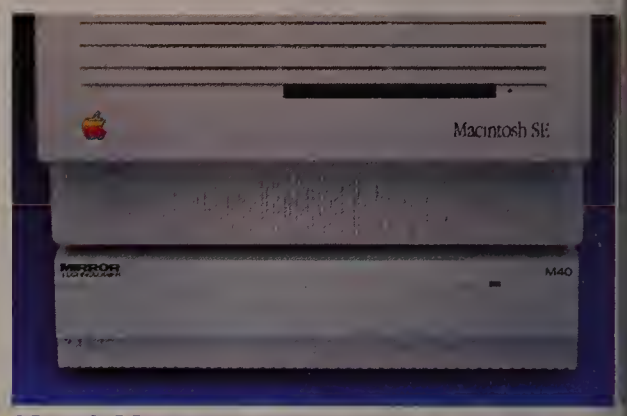
Economy. Mirror's great looks in a zero-footprint design that brings mass storage within anyone's budget, yet includes – free of charge as with all Mirror hard drives – Mirror's hard drive value package*. And with Mirror Technologies' return policy and one-year warranty, you can't go wrong.
*Includes Mirror Technologies' Hard Drive Value Package.



M30 30 Mb External

$597

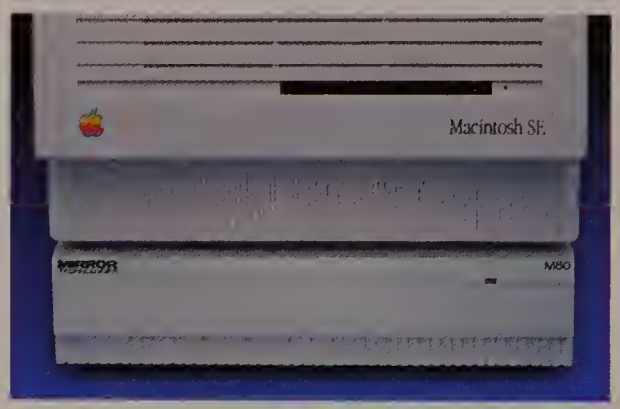
Our most popular drive. Enough storage for most personal applications at manufacturer-direct prices. Preformatted and easy to use – just plug in and play! Super reliable, and with all the extras at factory-direct prices.
*Includes Mirror Technologies' hard drive value package.



M40 & M40+ 40 Mb Externals

$687

Your choice. Lower price or blistering speed. The "Plus" version screams along at an amazing 19ms! And our "Plus" drives carry a two-year warranty. Heavy gauge steel cases, the finest hardware, and power supplies that just won't quit.
*Includes Mirror Technologies' hard drive value package.
M40+: Call for price.



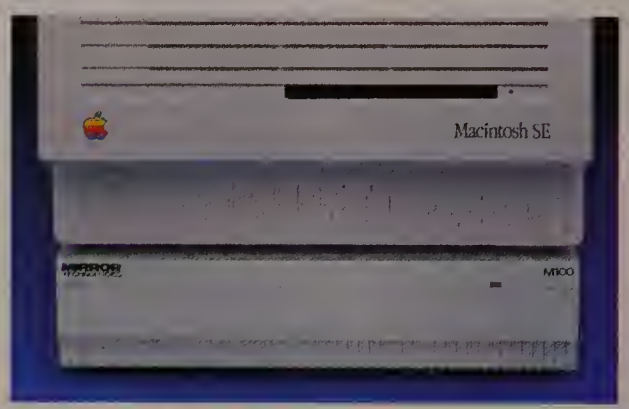
M80 & M80+ 80 Mb Externals

$947

Again, your choice: high speed or lower price. We'll double our usual one-year warranty on the 19ms "Plus" drive to two years. 80 Mb is enough for highly complex networking and accounting applications. Shop the price on other 80 Mb drives. Ours is less expensive, and you still get all of the Mirror extras!
*Includes Mirror Technologies' hard drive value package.
M80+: Call for price.

Our numbers look as good as our products.

It's because you buy straight from the manufacturer. No commissions. No markups. Just prices up to 40% less than you'd pay in a computer store. You still get all of the extras like our hard drive value package. And friendly, intelligent people who understand the MacIntosh.



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M200: Call.

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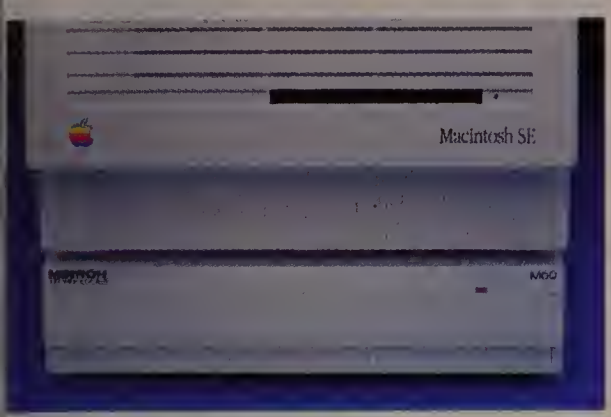

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Only Mirror Technologies allows you to add an internal hard disk in an SE already containing either two floppies or a floppy and a hard disk! Up to 200 additional Mb in your SE! And Mac II users can add *two* of our drives; up to 400Mb of internal storage, another Mirror exclusive!

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Think of it as a huge floppy disk. Using media developed by Kodak and Verbatim, the flexxy disks carry a lifetime guarantee! Speed? Our RM20 is as fast as most 20 Mb hard drives! An extremely low cost per Mb for backup, for archiving, or for your primary storage medium. And we sell our RM20 for over a hundred dollars less than the competition, complete with Hard Driver™ formatting and diagnostic utility, Symantec's LaserSpeed™ LaserWriter print spooler, and numerous other utilities, including a backup utility. External SCSI address selector, our whisper-quiet cooling fan, built in AC EMI/rRFI noise filter.

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Circle 424 on reader service card

Reviews

WriteMove

Portable ink-jet printer for the Macintosh.
Pros: *Tiny (10.8 inches by 6.5 inches by 2 inches); lightweight (3 pounds); dark, 192-dpi resolution; very quiet; runs on batteries; superb design.* ***Cons:*** *Sometimes forces postponement of print job; picky about paper; high-resolution printing only from proprietary fonts; expensive cartridges.* ***Company:*** *GCC Technologies.* ***List price:*** *$699.* ***Requires:*** *1MB; SCSI port; two 800K floppy drives; hard disk recommended.*

General Computer Corporation has always been willing to try something new. It was the first to introduce an internal hard drive for the Macintosh: the HyperDrive. It was the first to invent a low-cost laser printer: the Personal Laser Printer (PLP). Now it's even trying out a new name: GCC Technologies.

GCC's latest offering, the WriteMove ink-jet printer, is every bit as remarkable as the company's previous products but has fewer limitations. GCC is careful to market this astonishingly tiny, three-pound device as the printer for the person on the go. As such, the WriteMove is an unassailable success; it would be impossible to imagine a smaller, lighter, more concisely conceived machine.

A Dot Polka

The principle of the WriteMove's Diconix ink-jet printer (from which the WriteMove has been adapted), long established in the IBM world, is simple enough. A dot matrix printer like the ImageWriter has a column of tiny pins that strike the ribbon at precise moments as they travel across the page. In an ink-jet printer the pins are replaced by a column of tiny pinpoints in a thimble-size plastic container of ink. The printer spurts droplets of ink onto the page through these holes with the same precise choreography as that of the dot matrix printers.

Ink-jet printers in general have some distinct advantages over impact printers. First, they're nearly silent. Second, the resolution is better than that of 9-pin dot matrix printers; at 192 dots per inch (dpi), the WriteMove's output is halfway between the ImageWriter's (144 dpi at its best) and a laser printer's (300 dpi). A third advantage is that the images printed with an ink-jet printer are always jet black; there's no ribbon that can fade. In the case of the WriteMove, the ink cartridges don't last very long—after 100 pages or fewer, a $10 cartridge gives up the ghost—but every one of those pages exhibits much darker blacks than the ImageWriter's printouts do.

The WriteMove printer has some other solid selling points, too. The most important is that it shares its font technology with GCC's PLP—it uses an outline-font system from Bitstream. These fonts (which, unfortunately, must be installed in the system and used exclusively in order to get the WriteMove's high resolution) are stored in the Mac as mathematical formulas. As with PostScript fonts, that means you can enlarge or reduce any letter, word, or page in increments of 1 percent; and the printed letters will always be clean and smooth, no matter how jagged they look on screen. (Contrast this system with the ImageWriter's fonts, which only look good if you have the desired point-size font installed in the system.) In addition, WriteMove's fonts can be scaled, stretched, and rotated, just like PostScript fonts.

The WriteMove confers other blessings, too, as a result of its impeccable

"Inkjet Paper," High Quality

Times ABCD efgh 123456 **bold**, *italic*, ***bold italic***
Helvetica ABCD efgh 123456 **bold**, *italic*, ***bold italic***
Courier ABCD efgh 123456 **bold**, *italic*, ***bold italic***
Swiss Narrow ABCD efgh 123456 **bold**, *italic*, ***bold italic***
Zapf Calligraphic ABCD efgh 123456 **bold**, *italic*, ***bold italic***
Symbol: ΑΒΧΔ εφγη 123456 βολδ, *ιταλιχ*, *βολδ ιταλιχ*

Laser Printer Paper, High Quality

Times ABCD efgh 123456 **bold**, *italic*, ***bold italic***
Helvetica ABCD efgh 123456 **bold**, *italic*, ***bold italic***
Courier ABCD efgh 123456 **bold**, *italic*, ***bold italic***
Swiss Narrow ABCD efgh 123456 **bold**, *italic*, ***bold italic***
Zapf Calligraphic ABCD efgh 123456 **bold**, *italic*, ***bold italic***
Symbol: ΑΒΧΔ εφγη 123456 βολδ, *ιταλιχ*, *βολδ ιταλιχ*

Two Printing Samples
Text printed on the special clay-coated ink-jet paper that comes with the WriteMove is slightly blurry because the paper is so absorbent (top sample). The same image, a list of the standard Bitstream fonts supplied with the printer, when printed out on laser printer paper, is much clearer but takes longer to dry because the paper is so shiny and smooth (bottom sample).

MARK JOHANN

No False Moves
The WriteMove is quiet, and unbelievably small and light; its print is jet black; and for text and some graphics, its images are much crisper than the ImageWriter's.

Diconix design. To insert a page into the ImageWriter, for instance, you must go through two steps: pull the paper bail back from the platen, and then, so that you can adjust the position of the sheet, set the pin-feed/friction-feed toggle switch on pin-feed (so the printer won't grip it). The WriteMove printer, on the other hand, automatically releases its rubber-platen grip on the page when you pull back the paper bail. In other words, it's smart enough to know that you intend to insert a sheet of paper, so it relaxes its friction hold until the paper is positioned correctly and you replace the paper bail against the platen.

Imagine, too, a printer that can run on batteries. How, you may wonder, is there room for batteries in a printer so small that it would rattle around in a large Wheat Thins box? Simple. The batteries go inside the platen.

Your Handsome Prints

The WriteMove comes equipped with the same fonts that come with the Personal Laser Printer. If you use regular ImageWriter fonts, the WriteMove's output will look precisely the same as an ImageWriter's, with two exceptions: first, the image will be blacker; and second, the WriteMove driver (which you select from the Chooser) provides a fairly effective Smooth Screen Fonts option.

The WriteMove printer handles graphics in several ways. If it's a QuickDraw image (otherwise known as an object-oriented or MacDraw image), its printout will be very crisp and clean, at 192 dpi. If you're printing a MacPaint (bitmapped) graphic, however, the printer is limited to reproducing what's on the screen, exactly as the ImageWriter does. The WriteMove, however, has a Smooth Bitmapped Graphics option, and can reduce or enlarge graphics from 25 percent to 400 percent; a reduced image prints at higher resolution.

The printing quality, however, depends upon the paper you're using. The sample of special clay-coated ink-jet paper provided with the printer produces poor results; it's so absorbent that the ink seeps in and spreads slightly, giving mushy outlines to the characters. Regular pin-feed paper, typing paper, or even stationery produces better results. Best of all, however, is shiny, smooth laser printer paper, which the WriteMove manual specifically suggests avoiding. But images printed on this nonabsorbent paper, while extremely crisp and clear, take a long time to dry: just over a minute. I recommend that you use regular pin-feed paper for your drafts and print the finished copies on laser printer paper. You'll have to address envelopes by hand, however; the WriteMove can't help you there.

Writing the Wrongs

The similarities between GCC's WriteMove and PLP printers don't end with the font system and the decision to give Apple's mainstay printers a run for the money. The WriteMove, like the PLP, needs the Mac's memory and processor in order to operate.

This sometimes means you'll be informed that there's not enough memory to complete your printing job; at this point you have no choice but to exit the program and print the document from a separate Print Manager application. This can be infuriating. With a Mac Plus, the WriteMove can't print so much as a single card from HyperCard; you have to launch the Print Manager later in order to see the document you were trying to print.

The WriteMove is no speed demon, either; in general, it loses out to the ImageWriter in Best mode by a few seconds. The WriteMove does offer a fontless Draft mode, but this mode takes nearly twice as long as the blazing ImageWriter Draft mode.

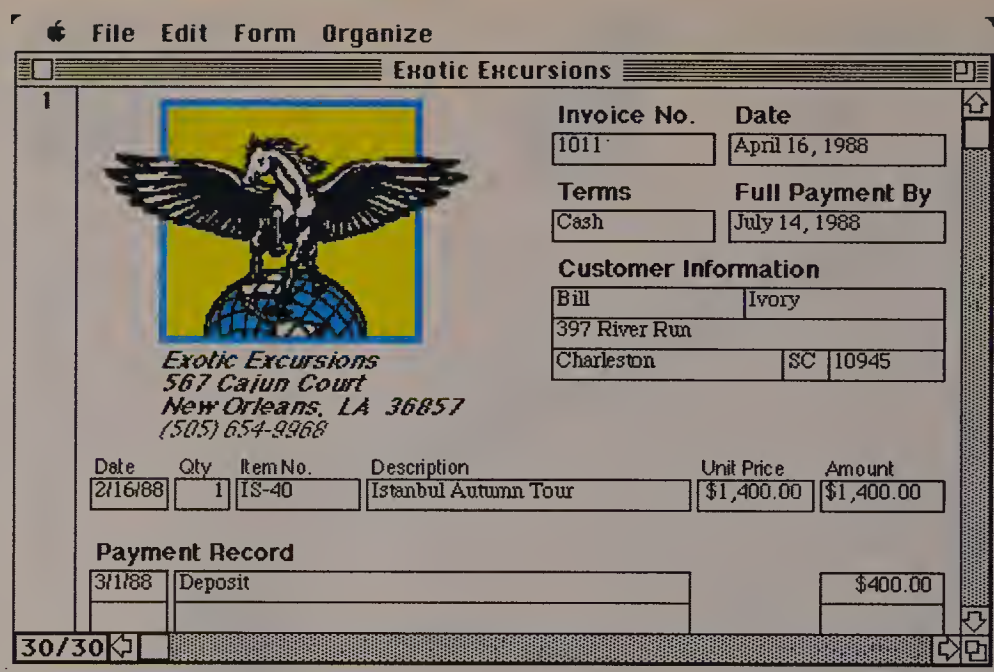
A final concern is that this small, lightweight printer may not be sturdy enough for the long haul. It seems to be trustworthy, but it hasn't been available long enough to demonstrate how it stands up to heavy use. And it shares the problems that accompany any ink-jet printer, such as occasional clogs (which are simple to clear up), and the necessity to replace the cartridge frequently.

GCC is marketing the WriteMove as a secondary, portable printer; in this capacity, it is an outstanding product. It may even be worth owning as a primary printer. Its $699 list price puts it within hailing distance of the ImageWriter II, making it a viable, Mac-friendly alternative to the ImageWriter. In selecting a WriteMove over an ImageWriter, you have better-looking documents to gain and little to lose: even with non-GCC fonts and bitmapped graphics, the WriteMove looks as good as the ImageWriter. This time, GCC has clearly made the right move.—*David Pogue*

See *Where to Buy* for contact information.

Microsoft File 2.0

Flat-file data manager. ***Pros:*** *Much faster than File 1.0; includes templates for most popular commercial forms; offers easy mail merge with Microsoft Word.* ***Cons:*** *Lacks database linking feature; primitive file import/export.* ***Company:*** *Microsoft Corporation.* ***List price:*** *$195.* ***Requires:*** *512K; two 800K floppy drives or 800K floppy drive with hard disk.*



Getting through Customs
All data fields and labels have customizable fonts and type sizes, and File 2.0 supports graphics fields (including color graphics) too. This almost gaudy data record entry hints at the possibilities.

When *Macworld* reviewed seven flat-file data managers (see "Data Basics," June 1988) Microsoft File 1.0 didn't fare too well: the reviewer considered it simple to use, but slow and lacking in features.

File 2.0 is still simple to use, but it's fast and has many more features. Microsoft has apparently concluded that one way to database users' hearts is through their printers: the program includes a huge set of specially designed sample templates so File can output data on standard, commercially available forms. File 1.0's already simple interface to Microsoft Word's print merge function has been further streamlined. There's now a Text option (Microsoft Word merge) in the Save dialog box. Word's print merge recognizes data saved in this way. Microsoft's vision of the universe is remarkably straightforward compared to most other database vendors'. The folks at Microsoft seem to believe that people want database programs mainly to keep name lists, produce merge letters, and print stick-on mailing labels—and that they want to perform these tasks with Microsoft products (it's possible to do a File merge with MindWrite, for example, but it's not easy). For these list management tasks, Microsoft has made File the price/performance champion in its class.

First, Speed

Microsoft File 2.0 performs notably better than its first incarnation. This first impression is confirmed by benchmarking. In a 1000-record set, File 1.0 took 1 minute and 34 seconds to select 30 records; File 2.0 did the same task in 20 seconds. Searching for a single record, the times were: File 1.0, 24 seconds; File 2.0, 1.6 seconds. Apparent sorting speeds are 20 to 30 times faster in version 2.0 than in version 1.0.

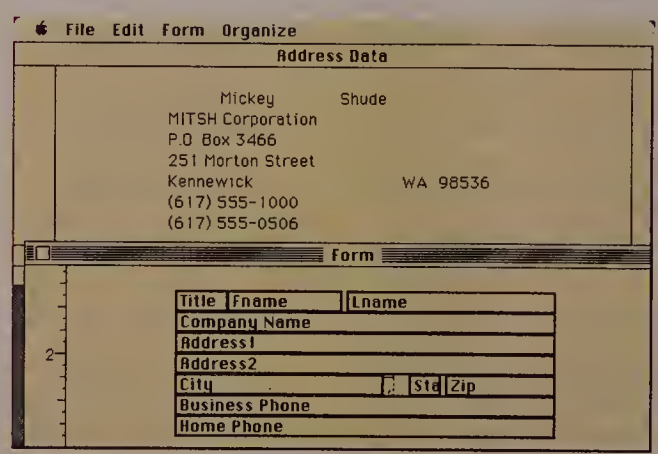
I refer to "apparent" sorting speed because File 2.0 automatically indexes all sortable nongraphic fields. This accounts for the large size of saved files; 50K or so of tab-delimited text turns into 150K of file under File. You can specify that certain fields not be indexed, resulting in a little bit of saved space. (The manual still describes and cautions about "index documents," a feature dropped from File 2.0 apparently at the last minute.) Because you probably have more disk space than free time, you can consider these changes in File's search/sort strategy to be improvements. File is now as fast or faster than notorious speed demons FileMaker II and OverVue (and, presumably, OverVue's successor, Panorama) for most common file manipulations.

Next, Features

Some new features simply amend deficiencies in File 1.0, and some offer real pluses. Some basic fix-ups include zoomable windows, support for multicolumn labels, compression of blank spaces, and calculation with date formulas. In addition, File 2.0 now offers Memo as a field type. Memo fields can hold up to 32K's worth of characters, but cannot be searched, unlike text fields. The addition of Custom Setup and Custom Print commands, to accommodate odd paper sizes on ImageWriters and LaserWriters, is useful for printing labels.

File 2.0 also supports networks (Microsoft expects you to buy a copy for each workstation), although File itself doesn't explicitly handle access privileges: AppleShare manages these.

Microsoft is currently bundling a macro program called AutoMac III (by Genesis Micro Software) with File 2.0. The program also includes a coupon that entitles you to a copy of SuperPaint by Silicon Beach. This way, reason the people at Microsoft, you can use AutoMac III to automate routine database procedures and SuperPaint to produce graphics that can be imported into database files as graphics fields for report and forms enhancement. Since these programs are clearly intended to bolster File's competitive position against FileMaker II, it's worth performing a direct comparison.



All That's Fit to Print
File 2.0 includes more than 100 predesigned templates for printing Deluxe and Avery forms on the LaserWriter or the ImageWriter. This example of a standard file card uses Avery Continuous Cards #4166.

File 2.0 vs. FileMaker II

As already noted, File is now as fast as FileMaker for file-handling operations and perhaps faster for sorting and searching in large files. For typical files the increased speed is not an advantage, but at least it's there. File is also about $100 cheaper at retail prices, translating into about a $60 difference in street price. File's coordination with specific commercial forms for printing—order blanks for Avery and Deluxe products actually shipped with File documentation—is hard to match.

(continues)

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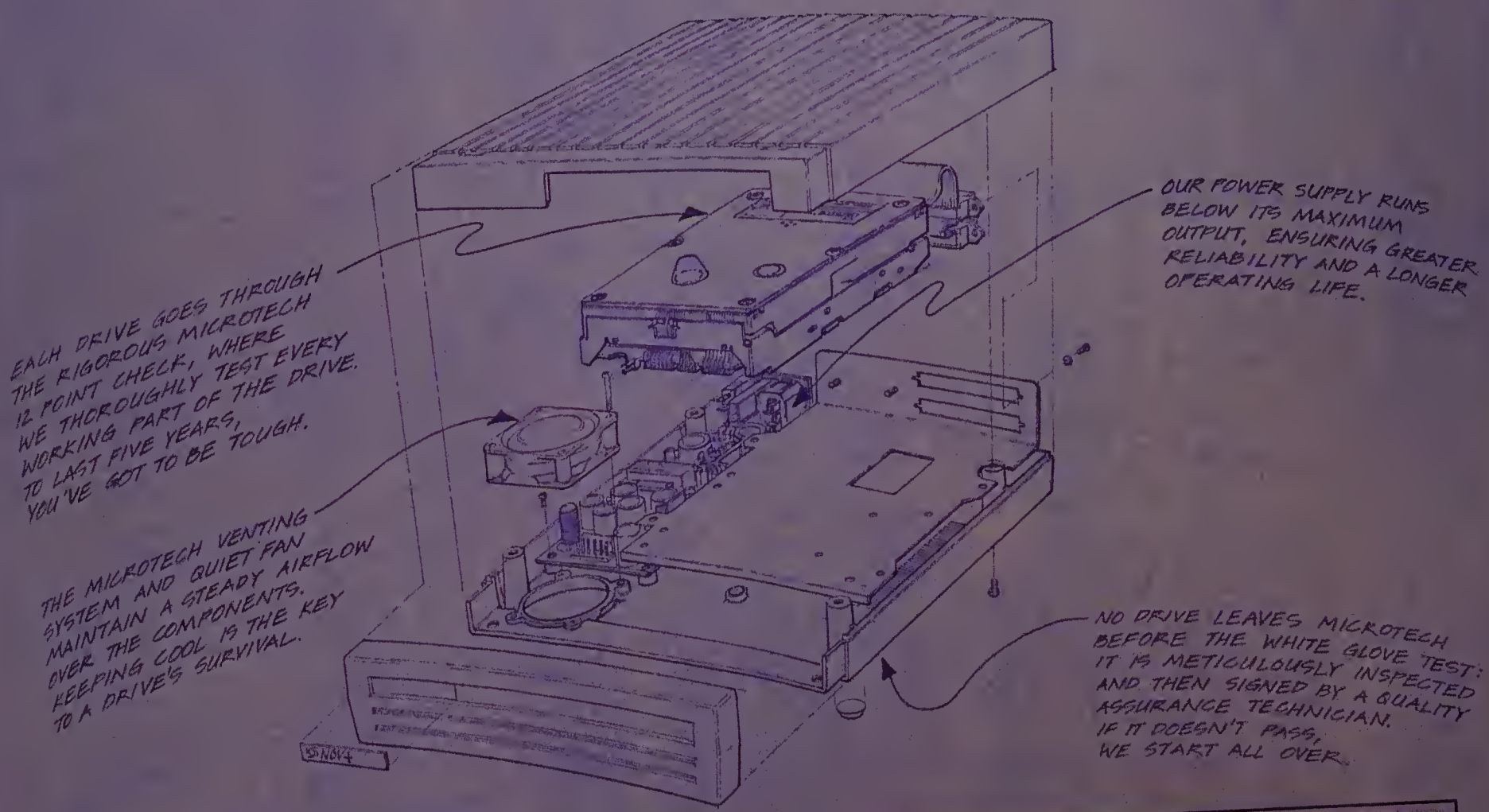

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100	25	$ 999.00	$1099.00
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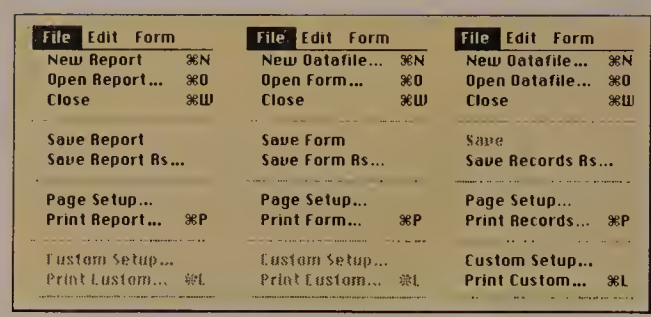

File for Reference
The File menu changes to show the options available when (left to right) a Report window, Form design window, or Datafile window is active. This important element of Microsoft's current interface style eliminates long, mostly grayed-out menus.

Despite the inclusion of graphics fields and the provision for speed through automatic indexing, the program is still pretty basic. Reporting facilities are still spartan and underdocumented. There are no math functions beyond arithmetic for computed fields. File imports and exports only through tab-delimited text, making it one of the few serious database programs than can't directly read or write Microsoft's own SYLK format for data exchange.

Database amenities are meager in File. FileMaker, for example, allows linking of its flat files in a way that is often helpful for duplicating sets of fields from one database to the next. File can't do this. FileMaker provides graphics tools for designing reports and forms as part of the program. In practice this is easier than switching between database and paint programs for simple graphics. And AutoMac III, nifty utility though it is, isn't as helpful as FileMaker's script facility for actual database work.

And the Winner Is . . .

If you need to perform complex database tasks but still don't need the full power (and attendant complexity) of a relational database, FileMaker II has the edge over File 2.0. But File is now the ultimate expression of the database as list manager for the Mac. If you need to produce mail merge documents with Word, and if your office already uses the standard business forms explicitly supported by File, this program should be your first choice. Microsoft has made File a superior performer of the routine chores required by a large part of the database market.—*Charles Seiter*

See *Where to Buy* for contact information.

Cricket Paint 1.0

Black-and-white bitmapped graphics program. ***Pros:*** *Extremely intuitive and polished; allows you to edit up to 300 dpi at page sizes up to 11 by 17 inches; permits you to resize and reshape new objects in context of drawing; outstanding manual.* ***Cons:*** *Overpriced; some frivolous new tools.* ***Company:*** *Cricket Software.* ***List price:*** *$195.* ***Requires:*** *1MB; two 800K drives or hard disk.*

Fortunately for the Macintosh world, some companies just won't listen to reason. Take Cricket, for example, which made what might seem like a shockingly misguided business decision: to introduce a new paint program. No color, no PostScript, no object-oriented layer. Just a black-and-white, bitmap MacPaint clone.

With the well-entrenched MacPaint, FullPaint, and other bitmap programs to compete with—not to mention bitmap-and-object editors like SuperPaint, Canvas, and DeskPaint; or color programs like PixelPaint, Graphist Paint, and Modern Artist—how can Cricket Paint succeed?

The answer: with flying blacks and whites. Cricket Paint is polished, elegant, and intuitive. Sure, it has some new tools—various Spirograph-type effects, a three-dimensional polygon tool (see "Neat-o Tools"). While these tools are stunning to watch, they're not always useful for day-to-day projects. But Cricket Paint implements the traditional painting tools (paintbrush, pencil, lasso, and so on) with an imagination and finesse that make you wish Cricket would write a word processor; this attention to the basics is what makes Cricket Paint superior.

Everything Old Is New Again

The most bizarre aspect of the "innovations" in Cricket Paint is that most of them originated in other graphics programs. There's a Pen tool, for example, whose operation is lifted directly from PostScript drawing programs like Illustrator and FreeHand—but the lines it draws, of course, are bitmaps. And there is a radial shading option modeled on the sunburst-type fill patterns of Cricket Draw—but the output, of course, isn't smooth, 300-dots-per-inch (dpi) PostScript. Another feature, cribbed from Draw It Again, Sam, lets you create a library of frequently used elements of a drawing. And, in a strange, backhanded tribute to object-oriented programs like MacDraw, there is FreshPaint.

FreshPaint, implemented in roughly half of the tools in Cricket Paint's palette, must be seen to be fully understood. When you release the mouse button after drawing with one of these tools, the shape you have just created sprouts handles, precisely as it would in MacDraw. By dragging these handles, you can reshape the object, move it, or change its fill pattern or line thickness by making selections from the tool palette. Only when you click on the screen outside of the shape does the program "dry" the object into an immovable bitmap.

The advantage of this feature is that you don't need to make decisions about size, shading, and placement before you create the object; after a while, you'll find yourself slapping an object haphazardly onto the screen, secure in the knowledge that the fine-tuning can come later.

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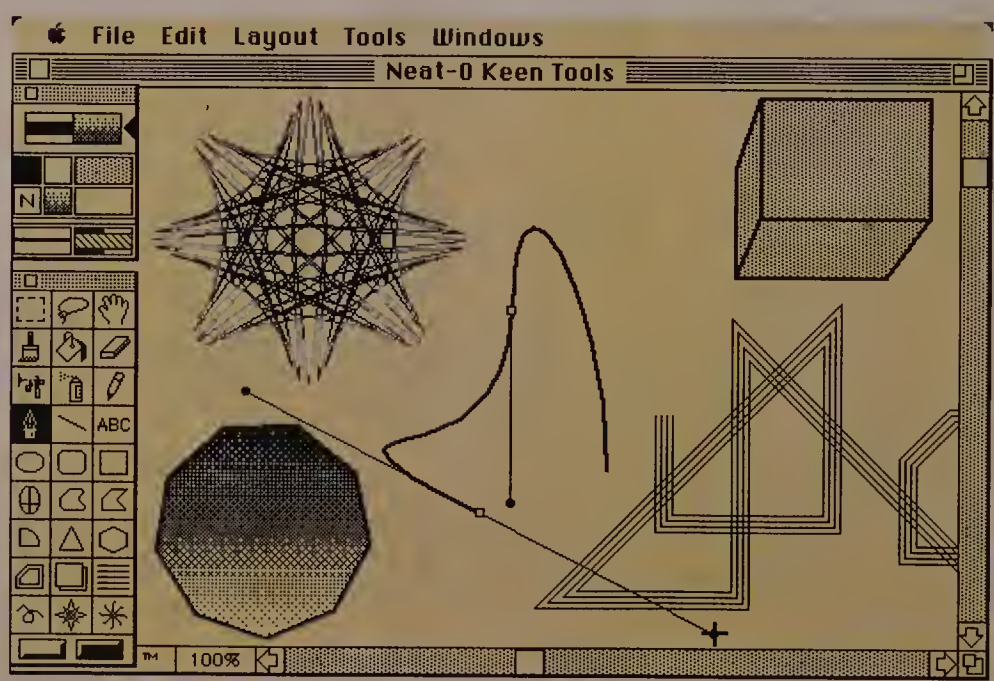

Neat-o Tools
Some of Cricket Paint's new tools in action (clockwise from upper right): the Block tool, the Parallel Polygon tool, a nonagon made with the Hyper Polygon tool (and shaded with Radial shading), the Spiro Polygon tool, and the Pen tool (center), with its control points still visible.

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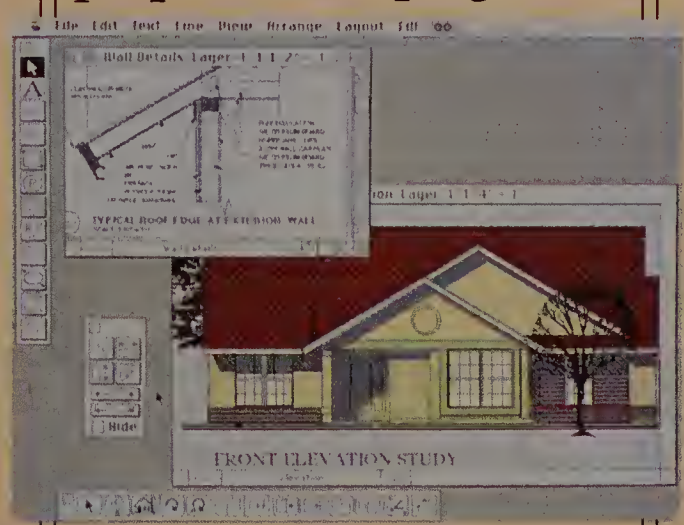

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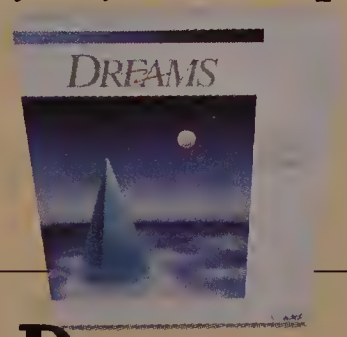

DREAMS.

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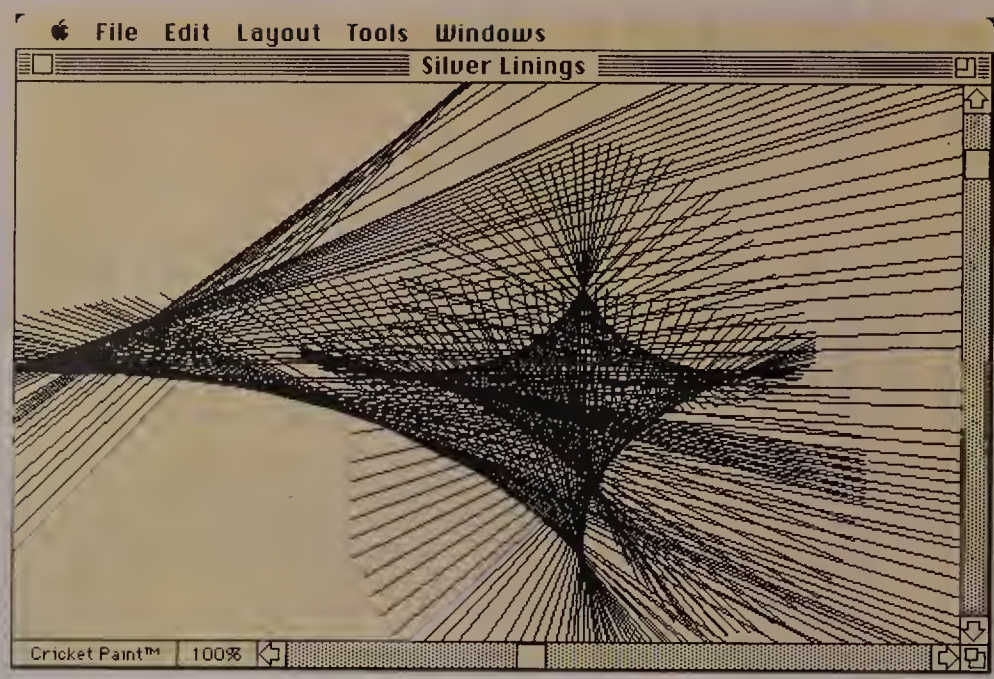
Circle 151 on reader service card



Line Art
This entire drawing was created in Cricket Paint with a single click-and-drag using the Background Lines tool.

You'll be convinced of the intelligence of the FreshPaint approach when you return to an older paint program, draw a rectangle, scrunch up one eye, gauge its size in relationship to the other elements of the drawing, and decide it could be a little smaller. Too late! It was frozen into position the moment you released the mouse.

Whistles and Bells

Most of the other new features in Cricket Paint are far less significant. Two of them are Spirograph pattern creators—glorified versions of the original MacPaint's Brush Mirrors. They're fun to watch but of limited practical value.

Believe it or not, Cricket Paint also has a cube-drawing tool, in which the center of the screen is the vanishing point; as you drag the FreshPainted cube around on the screen, the cube changes shape to reflect the new position. This produces a rather impressive, animation-like effect, but the moment you click on the drawing and the FreshPaint dries, the object becomes just an immovable cube that you could have drawn in traditional ways.

Of all the glitzy new tools on the Cricket Paint palette, the most imaginative is the Background Lines tool. All it does is draw parallel lines extremely well: close together or far apart, thick or thin, vertical or diagonal. You can specify the thickness, pattern, and angle of the lines. Best of all, when you hold down the ⌘ key as you drag the mouse across the screen, the lines spill and tumble, the window scrolls to make room, and the screen fills with dazzling, shooting arrays of straight lines in overlapping, interwoven moiré patterns (see "Line Art"). The actual process of using the tool is more breathtaking than the bitmapped result. Watching the Background Lines tool at work is the best therapy you can buy on a 3½-inch disk.

Despite these flashy but slightly impractical tools, Cricket Paint wins the award for elegance. You can specify any document size up to 11 by 17 inches. You can work in any of seven resolutions, up to 300 dpi, which makes Cricket Paint a good choice for editing scanned graphics; the program reads MacPaint, TIFF, and PICT files. Cricket Paint lacks the ability to edit the spray can's shape and rate of flow, but all the other bells and whistles of current paint programs are present: you can slant, distort, and rotate shapes; edit patterns; move or hide tool palettes; trace edges; open multiple documents; split the screen to see two magnifications at once; and so forth. And, most important for the true artist, the tilde (~) key works as Undo.

Top of the Line

With the exception of FreshPaint, Cricket Paint's new features are fun but not worth paying extra for. When you get right down to it, $199 is a lot for a program that creates only bitmaps, particularly if you already own one of its predecessors. For less money, you can buy a bitmap-and-object editor, perhaps with color support, that has less panache but more utility.

But if you are indeed looking for an easy-to-use, monochrome paint program, Cricket Paint is the best of the lot. Its manual is a model of clarity, organization, and graphic design. And to Cricket, for entering a crowded market out of simple determination to write a better program: a toast.
—*David Pogue*

See *Where to Buy* for contact information.

QMS ColorScript 100

Color PostScript printer. ***Pros:*** *With PostScript typesetter (like the Linotronic), PostScript printing creates more accurate proofs of color images; installs and operates like a LaserWriter.* ***Cons:*** *Expensive; truncates some images because of small print area; application must support color PostScript or output will be black and white.* ***Company:*** *QMS.* ***Price:*** *Model 30, $21,995; Model 20, $16,995; upgrade from Model 20 to Model 30, $5995.*

It's big, it's heavy, and it's expensive, but it prints in living, PostScript color. The QMS ColorScript 100 was the first color output device for the Macintosh to support the same AppleTalk interface and PostScript page-description language as the Apple LaserWriter. The ColorScript is worth looking into for many of the same reasons that make PostScript printers a superior choice for black-and-white desktop publishing.

Except for lifting the controller and printer (together they weigh just over 110 pounds), installing the ColorScript 100 is as easy as installing a LaserWriter. You simply connect it to the AppleTalk network (the cable isn't supplied), select the standard LaserWriter driver using the Chooser, and print as you would to a LaserWriter. There are some glitches, though, that keep the conversion to color DTP from being quite as simple as it may appear at first.

What Can It Do?

The ColorScript comes with the same 35 typefaces as LaserWriter Plus and LaserWriter II. The Helvetica Narrow downloadable font is provided on disk, and all corresponding QuickDraw screen fonts are supplied as well. Unfortunately, most applications treat the ColorScript exactly like a LaserWriter, right down to rendering the image in black and white. Only applications that specifically support the color extensions to PostScript (including PixelPaint, Cricket Draw, Illustrator 88, and FreeHand) will print in color. A future release of the LaserWriter driver could remedy this problem, but at the moment even newer programs like MacDraw II won't print in color on the ColorScript.

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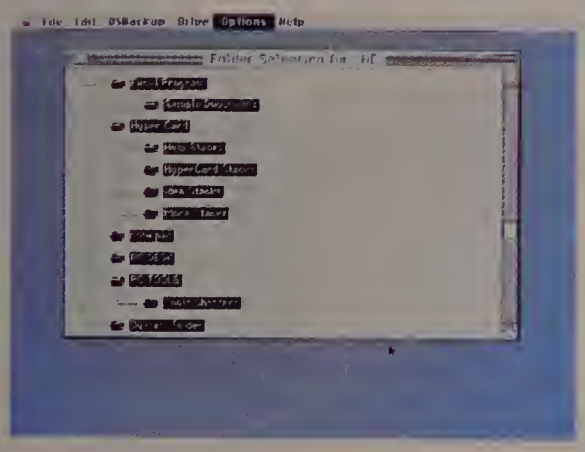
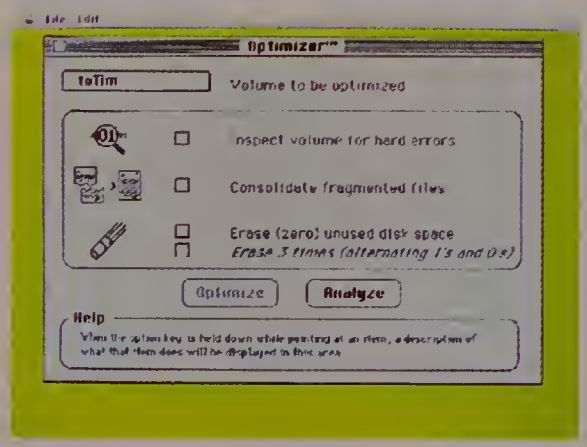
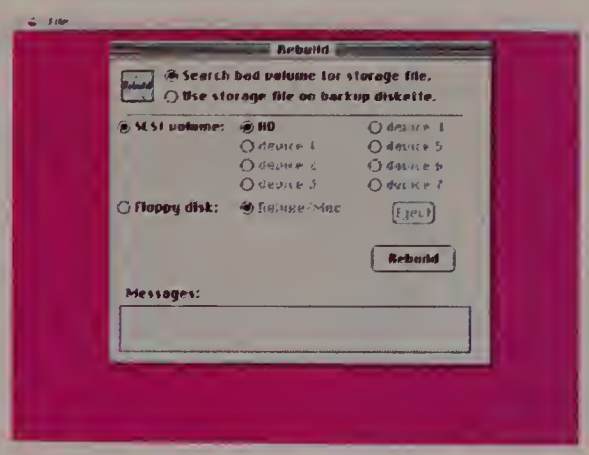
The #1 Tool Kit.



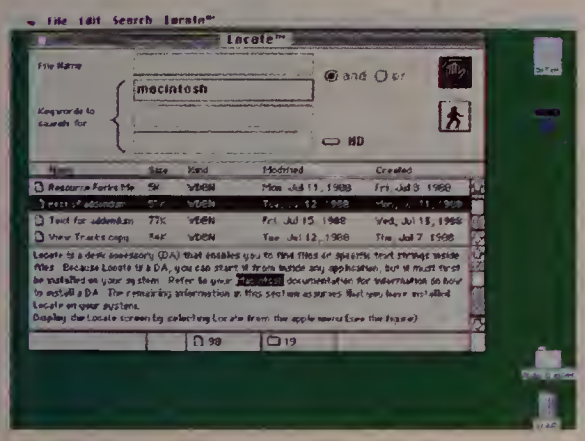
Back up your hard disk–fast.



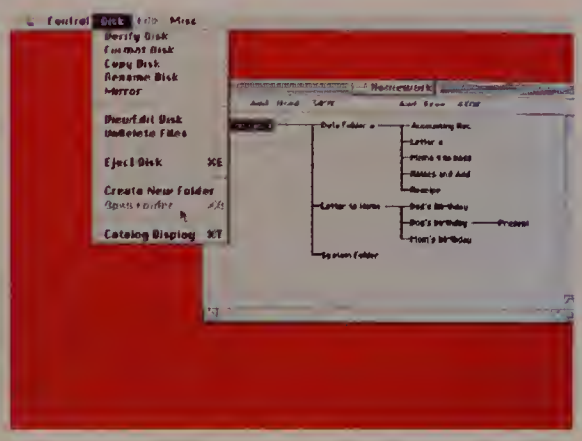
Optimize your hard disk for better performance.



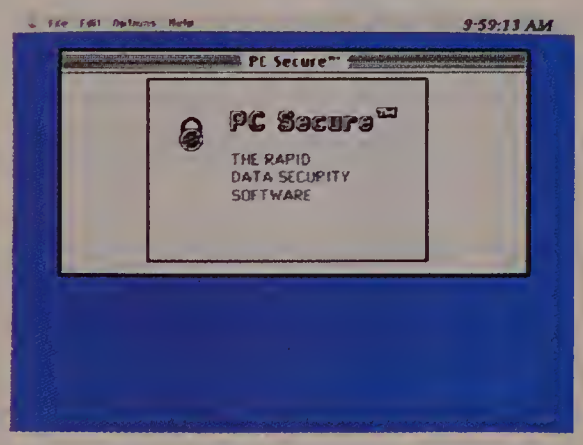
Recover a damaged disk or undelete accidentally erased files.



Locate files on your hard drive.



View and/or change folder organization.



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The ColorScript comes in two models. Both use a 68020-based controller with 8 megabytes of memory. The model 20 prints an 8½-by-11-inch page, while the Model 30 can print on tabloid-size (11-by-17-inch) pages and includes a 20MB hard drive to hold downloaded and cached fonts. Like most other 300-dots-per-inch (dpi) color printers, the ColorScript 100 uses a thermal transfer mechanism to print in color by melting small dots of a wax-based pigment onto special paper or thermal transfer transparency film (see "Printing a Rainbow," *Macworld,* January 1989). The printer will output at its full 300-dpi resolution only if you restrict your output to the six additive and subtractive primary colors (red, green, blue, cyan, yellow, and magenta) and black. To simulate more colors, the ColorScript uses PostScript's halftone algorithm to print clusters of primary color dots which combine visually to form intermediate colors. However, those full-color images have an effective resolution of only about 60 dpi. Prints at that resolution are acceptable as proofs, or as camera-ready copy in some applications that use the ColorScript's built-in color separation capability, but output generally must be restricted to primary colors.

How Well Does It Work?

Although the ColorScript's color output won't exactly match what's displayed on the screen, the fact that it's a PostScript device means that the proofs it generates will closely match the process colors you'll get if you perform your final color separations on a high-resolution PostScript output device like a Linotronic 300. QMS has announced that it will support color matching using the Pantone system. The ColorScript will be able to render all 747 standard Pantone colors except for 13 fluorescent and metallic hues that cannot be reproduced using 4-color process printing techniques.

MAX SEABAUGH

This Adobe Illustrator file was printed on the ColorScript printer.

ROBERT HOLMGREN

QMS ColorScript 100

The ColorScript's documentation clearly discusses installation and operation procedures in both Macintosh and MS-DOS environments (the printer includes standard serial and Centronics parallel interfaces in addition to AppleTalk) and thoroughly covers QMS's implementation of PostScript and its color extensions.

The biggest single problem I found was that the image area on the ColorScript is significantly smaller than the LaserWriter's. Unfortunately, the LaserWriter driver and, therefore, most applications don't recognize the difference and send the image exactly as if they were sending to a LaserWriter; the ColorScript then truncates the top or bottom of the image. The manual discusses ways to work around that limitation when printing small or single-page documents, but if you attempt to print multipage images with the intention of taping them together to form a large image, you'll find that bands of your document are missing at the top and bottom of each sheet. In many cases there is no effective workaround for this problem.

Is Color Worth the Price?

If you publish in color and generate your separations electronically on a PostScript output device, the ColorScript is a reasonable choice for a proofing device. Its ability to generate color transparencies and to produce good quality 300-dpi black-and-white or spot-color prints make it a useful printer in its own right. Unfortunately, its incompatibility with many applications that can otherwise print in color, its lack of any screen-snapshot or colorizing utilities to help overcome those incompatibilities, its high price, and its propensity to truncate images mean that the ColorScript is far from an automatic first choice for a color printer. If your needs for PostScript color outweigh the limitations, and your budget can handle the strain, the ColorScript is a solid, reliable, and easy-to-use product. Unless you have those overriding needs, though, it might pay to wait for PostScript color output technologies to mature.
—*Ron Risley*

See *Where to Buy* for contact information.

NetBridge

Bridge for creating an internet.
Pros: *Well-designed software; assignable privileges restrict access to zones; easy to install; password protection for bridge settings.* ***Cons:*** *Cannot function as a half-bridge; very limited traffic diagnostics.* ***Company:*** *Shiva Corporation.* ***List price:*** *$499.* ***Requires:*** *512K.*

As a LocalTalk network grows larger, traffic can seriously reduce its effectiveness. A common way of restricting network traffic is by grouping and isolating devices and users. The Shiva NetBridge is the latest network bridge to make such configurations possible and easy to set up.

Just Plug Everything In

NetBridge allows you to combine two separate LocalTalk networks into one larger *internet* or to split an existing network into two smaller networks to control the flow of traffic. If, for instance, your network has a small group of heavy LaserWriter users, the NetBridge enables you to isolate them from the other members of

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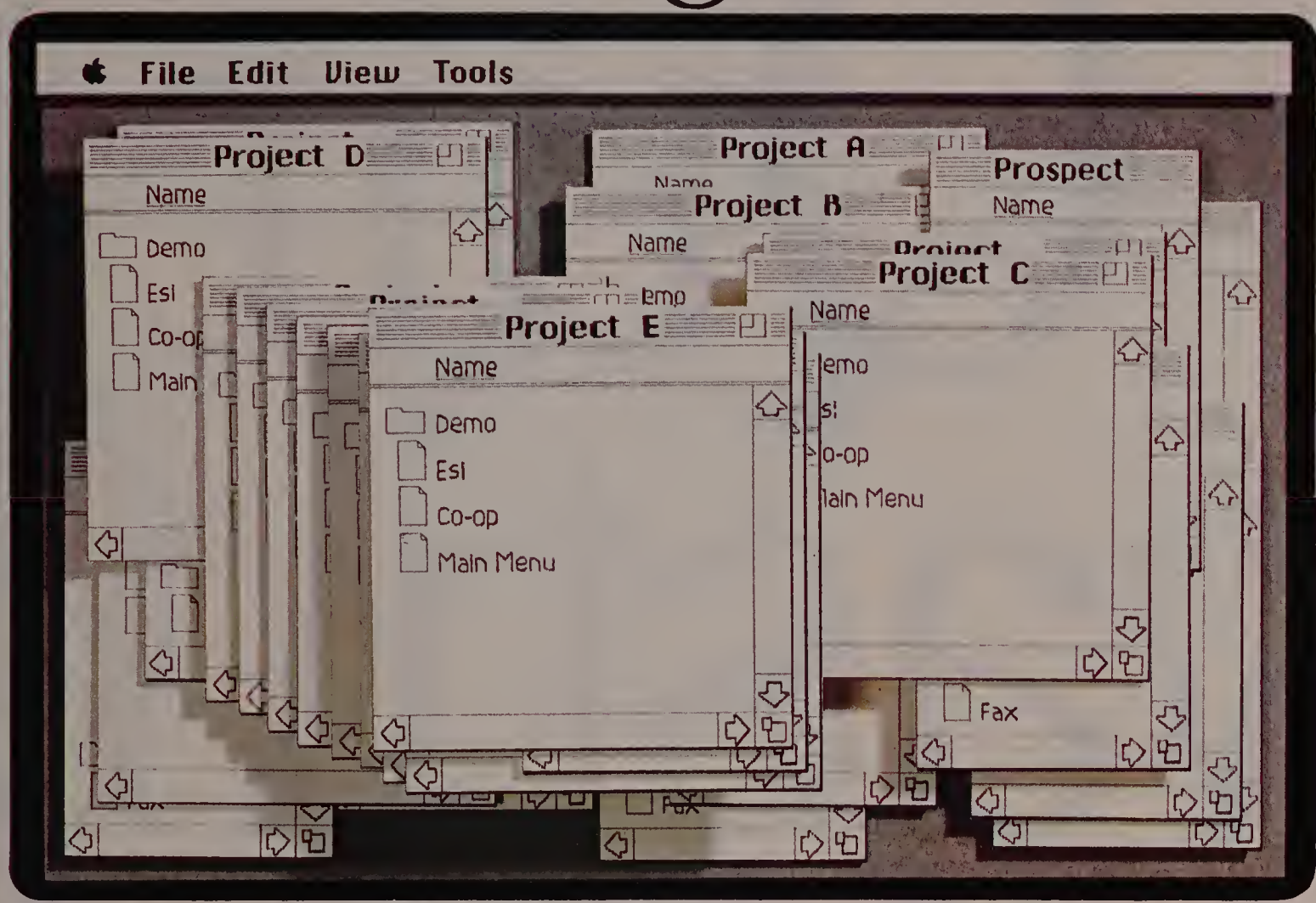
Are Your Files Stacked Against You?



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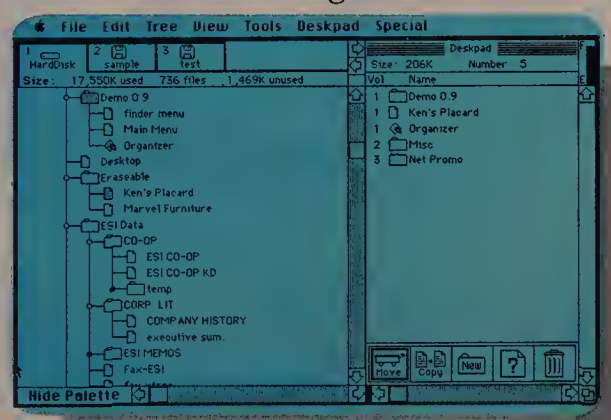

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Quit wasting time.

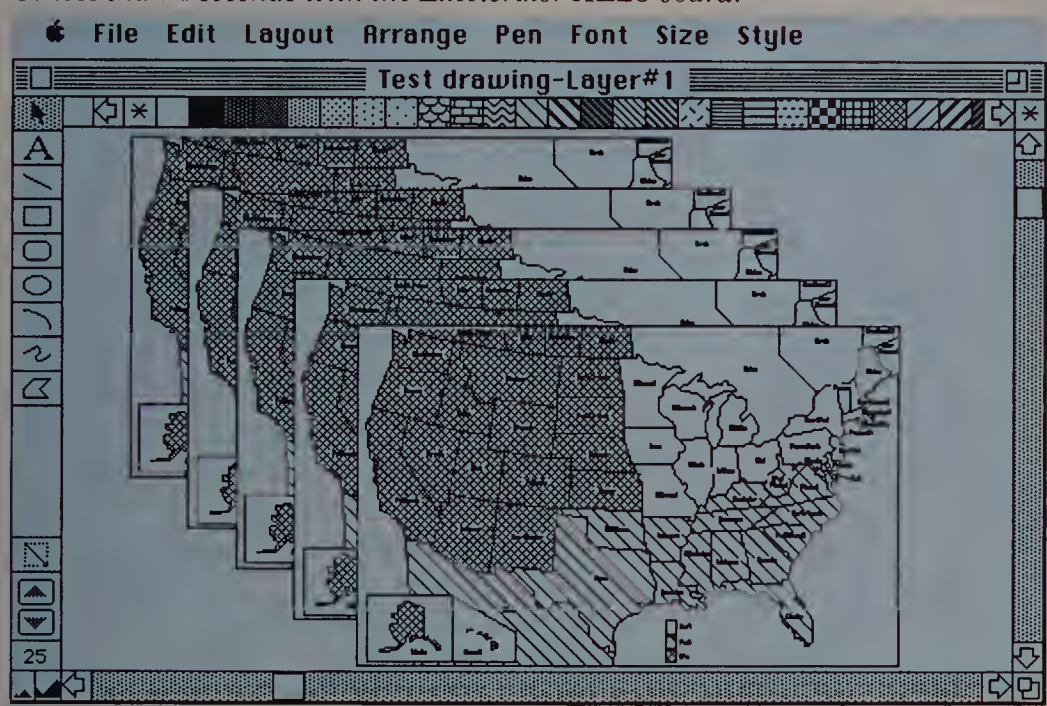
File Edit Formula Format Data Options Macro Window

F500 =D500+E500

Fill Down

	A	B	C	D	E	F
1	Base Point	1st Quarter	Q-2 YTD	Q-3 YTD	Foreign	Total YTD
2	11.50	23.50	35.00	58.50	93.50	152.00
3	12.00	24.00	36.00	60.00	96.00	156.00
4	12.50	24.50	37.00	61.50	98.50	160.00
5	13.00	25.00	38.00	63.00	101.00	164.00
6	13.50	25.50	39.00	64.50	103.50	168.00
7	14.00	26.00	40.00	66.00	106.00	172.00
8	14.50	26.50	41.00	67.50	108.50	176.00
9	15.00	27.00	42.00	69.00	111.00	180.00
491	256.00	268.00	524.00	792.00	1,316.00	2,108.00
492	256.50	268.50	525.00	793.50	1,318.50	2,112.00
493	257.00	269.00	526.00	795.00	1,321.00	2,116.00
494	257.50	269.50	527.00	796.50	1,323.50	2,120.00
495	258.00	270.00	528.00	798.00	1,326.00	2,124.00
496	258.50	270.50	529.00	799.50	1,328.50	2,128.00
497	259.00	271.00	530.00	801.00	1,331.00	2,132.00
498	259.50	271.50	531.00	802.50	1,333.50	2,136.00
499	260.00	272.00	532.00	804.00	1,336.00	2,140.00
500	260.50	272.50	533.00	805.50	1,338.50	2,144.00
501						

Excel with Excel. It takes almost 17 seconds to fill this spreadsheet on the Mac SE. Or less than 4 seconds with the Excelerator XL25 board.



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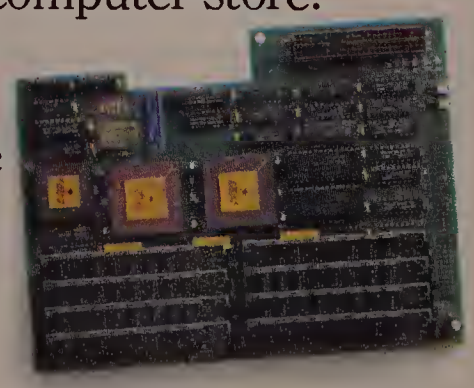

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the network. Since all the users remain part of one internet, the heavy printer users can still communicate with the others whenever necessary, and anyone can use the LaserWriter. But the brunt of the printer traffic is localized so that it doesn't affect all users unnecessarily. You cannot, however, use two NetBridges with modems to act as half-bridges for linking two remotely located networks, as you can two Hayes InterBridges.

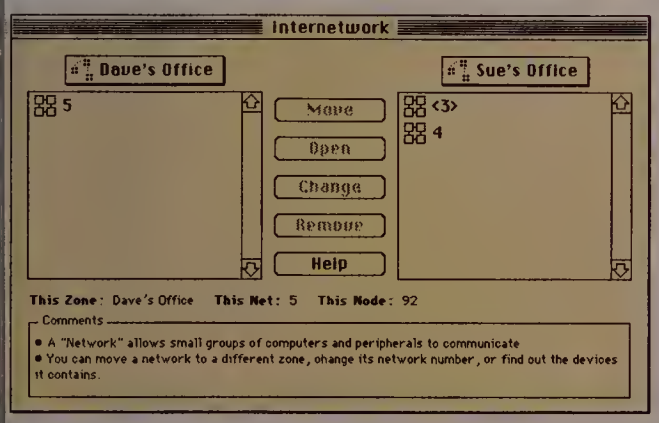
NetBridge is exceedingly simple to set up. Plug a LocalTalk connector from the first network into one NetBridge port, plug a LocalTalk connector from the second network into the other NetBridge port, plug in the power, and turn on the power switch—you're all set.

The NetBridge automatically communicates with any other bridges on the internet to determine their network number and zone. If there are no other bridges on the network, the NetBridge assigns itself a network number and assigns both its ports to the same zone.

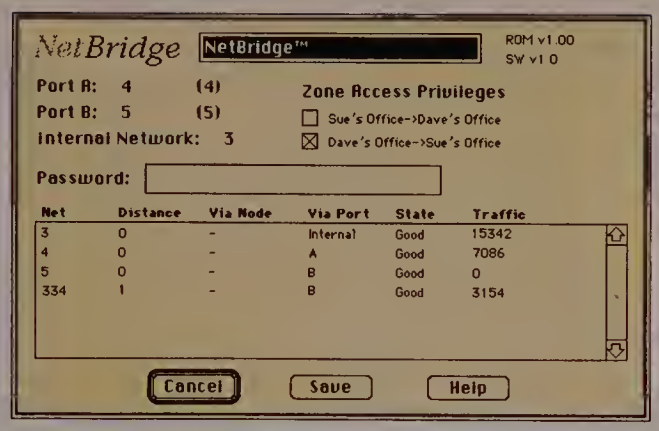
Managing a Network

So far, you've linked together two networks using the NetBridge. If you want to create logical groups (zones) of workstations and other devices, you'll have to use the Bridge Manager software that ships with the NetBridge. Bridge Manager allows you to see all NetBridges and Hayes InterBridges that are part of the internet. Then using Bridge Manager you can create zones, assign networks to zones, or redefine existing zones.

The Bridge Manager makes network configuration very easy. Its interface for



Checking the Network
The Internetwork window displayed by Bridge Manager allows you to view different parts of the internet at the same time. In this case, the zone called Dave's Office appears on the left-hand side, while another zone called Sue's Office appears on the right. Selecting a network enables the central buttons, which allow you to move networks from one zone to another or to change their configuration.



Configuring a NetBridge
Unchecking a box under Zone Access Privileges disables access between zones, in the direction indicated by the arrow. Here the upper box is unchecked, so no one in the zone called Sue's Office can communicate with devices in the zone called Dave's Office. The lowest window in the display shows all known nets. The distances given are measured in hops, *that is, the number of bridges that must be traveled to reach that network.*

moving networks between zones resembles that of Font/DA Mover (see "Checking the Network"). Also, to find out what devices constitute a particular network, just double-click on the network number and you see all the registered services (such as servers and workstations) that make up that network.

When you select a NetBridge's name from the list of bridges on the Internet you see the configuration for that particular bridge (see "Configuring a NetBridge"). You see the NetBridge's name, the network numbers for each of the NetBridge's two ports, and the NetBridge's routing table, which that bridge uses to communicate with other bridges on the internet. If you want to change that NetBridge's configuration, you have to enter a password. Shiva has also added a feature to its bridge called Zone Access Privileges. By assigning access privileges you can prevent members of one zone from communicating with another zone.

Although the NetBridge displays information about the traffic that has passed through the bridge, Bridge Manager does not provide any diagnostic information, like that provided by the Hayes InterBridge software. Information such as the number of bad *packets* (a block of data for data transmission), packets with net number conflicts, and the number of packets routed can prove useful in diagnosing network problems and in determining how a network should be reconfigured with another bridge.

At the moment, Shiva only provides files for working with the NetBridge and the Hayes InterBridge. As other bridges become available, the company intends to make the required files available to NetBridge owners.

Expand Your Network, Locally

The Shiva NetBridge is an ideal bridge for connecting two networks or splitting a network to isolate busy users. The bridge is simple to set up, and zone configuration is a snap with Bridge Manager. At $499, the NetBridge is a bargain when compared with the $799 price of the Hayes InterBridge. If you're really interested in linking two networks via half-bridges and high-speed modems, however, you'll have to pass on the NetBridge and choose the Hayes InterBridge instead.—*Dave Kosiur*

See *Where to Buy* for contact information.

Microsoft Works 2.0

Integrated productivity software. ***Pros:*** *Easy to learn and use; unique integration of several powerful tools.* ***Cons:*** *Slow with large files; buggy first release.* ***Company:*** *Microsoft Corporation.* ***List price:*** *$295.* ***Requires:*** *1MB.*

Since its introducton in late 1986, Microsoft Works has hovered near the top of the Macintosh software hit parade with good reason. Combining the most important productivity tools in a low-cost package, it is an ideal program for users who are new to the Mac and those who prefer simplicity over power. Like most integrated software packages, Works includes a word processor, a spreadsheet with charting capabilities, a file manager that performs basic database functions, and a telecommunications module. But version 2.0 adds powerful new drawing tools and other features that put it in a class by itself.

Color Works

Probably the most striking addition to Works is color. Choosing a color for a section of text, a part of a drawing, or a print-

(continues)

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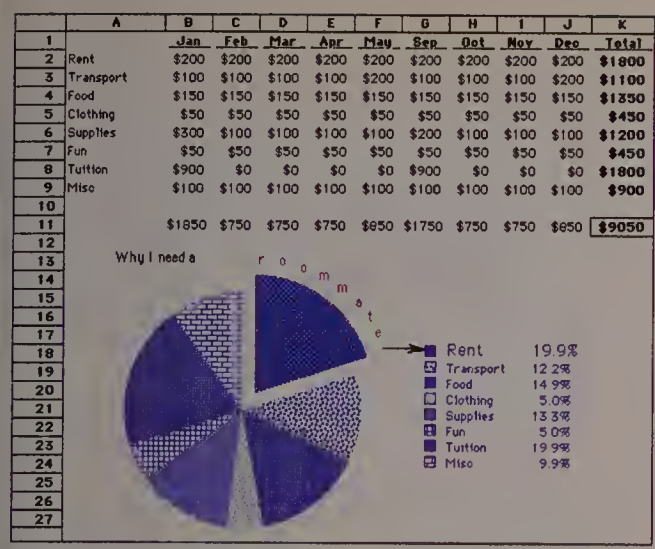

	Jan	Feb	Mar	Apr	May	Sep	Oct	Nov	Dec	Total
Rent	$200	$200	$200	$200	$200	$200	$200	$200	$200	$1800
Transport	$100	$100	$100	$100	$200	$100	$100	$100	$200	$1100
Food	$150	$150	$150	$150	$150	$150	$150	$150	$150	$1350
Clothing	$50	$50	$50	$50	$50	$50	$50	$50	$50	$450
Supplies	$300	$100	$100	$100	$100	$200	$100	$100	$100	$1200
Fun	$50	$50	$50	$50	$50	$50	$50	$50	$50	$450
Tuition	$900	$0	$0	$0	$0	$900	$0	$0	$0	$1800
Misc	$100	$100	$100	$100	$100	$100	$100	$100	$100	$900
	$1850	$750	$750	$750	$850	$1750	$750	$750	$850	$9050

Drawing Conclusions
This pie chart was generated from spreadsheet data, pasted into the spreadsheet document, and edited and embellished using the new drawing tools. The word roommate *was stretched along a curve using the Spread Text command.*

out is no more difficult than choosing a font: simply select one from the menu of eight possibilities. But until color monitors and printers become more common, this feature probably won't excite the typical Works user, who has a Mac Plus or SE.

Most Works users aren't likely to be affected by the added support for the Apple Extended Keyboard either. But they'll certainly notice the switch to hierarchical menus, which replace many of the previous version's dialog boxes with time-saving pop-up submenus.

Another potential time-saver is the macro option, which records the tasks you perform. There's no way to edit a macro, though, so you can't tell it what to do if conditions don't match the ones under which it was recorded. If your macro for connecting to CompuServe encounters a busy signal, for instance, it just keeps typing, oblivious to the fact that nobody's listening.

One Works feature that still needs improvement is the primitive method of creating page headers and footers. Typing **"&LWorks&RPage &P"**, for instance, prints a justified, numbered header at the top of each page. Fortunately, a new Print Preview option allows you to peek at the results before you commit to paper.

Word Works

The word processor is a practical, no-frills word machine. When used with the database, it can easily print multiple-column mailing labels, personalized form letters, and custom forms.

A built-in version of the Spellswell spell-checker, with a 60,000-word customizable dictionary, has also been added. It's easy to use, relatively intelligent, and compatible with other Spellswell dictionaries.

Works' word processor won't satisfy everybody. Some users will want more keyboard shortcuts and automatic footnoting, hyphenation, and outlining.

Art Works

Still, Works has something few high-end word processors offer: a built-in, full-featured drawing program. Rather than having to import pictures created and edited with other applications, you can now create drawings on the spot or modify imported object-oriented drawings. And since the drawings exist on a separate, transparent layer of a document, you can first place the graphics and then arrange text around them to suit your publishing needs.

The drawing module also includes a tool that places blocks of text on the drawing layer itself. Since text blocks can be linked, it's possible to create multiple-column documents this way. Unfortunately, you are limited to one justification style per block, and beginners may find it confusing to place text on two different layers. Most users will find text blocks useful for short sidebars or captions, but inadequate for long documents.

Data Works

The drawing tools are available in the Works spreadsheet module, too. You have always been able to produce quantitative charts from spreadsheet data in Works; but in version 2.0, you can paste these charts into a spreadsheet (or a word processing document) and customize them with different patterns, colors, text, and styles from the drawing toolbox. Pies can be expanded, bars stretched, legends edited, flourishes added—all within Works. With these graphics tools and the new font- and style-control options, you can customize a document in ways that few other spreadsheet applications allow.

Another impressive new feature enables you to attach pop-up notes to individual cells. These notes can remain simple on-screen reminders, or you can have them print as footnotes. The spreadsheet module also boasts a larger capacity (256 columns by 16,382 rows) and new date/time functions.

Changes in the database module are less significant. This basic file manager now allows you to change the font and size of text in database documents, accepts date/time functions, and allows a little more flexibility in the creation of reports.

The Whole Works

The individual pieces of Works are impressive in their own right, but their real strength is in their integration. The Works user interface is, for the most part, intuitive and easy to learn. And the Works environment enables you to open a variety of document windows, MultiFinder-style, on a basic 1-megabyte Mac. Information can be easily and quickly passed back and forth between windows in almost any combination.

Although Works slows down considerably when you approach your machine's memory limits, it admirably performs the tasks that occupy most Macintosh users most of the time.

The manuals are complete and clear, both for learning and for reference. If you include the help file in the same folder as the application, you're never far from on-screen documentation. For new users, there's a HyperCard tutorial that introduces the most important features of Works in an interactive format.

I found a few worrisome bugs in version 2.0. There were sporadic system crashes when I tried to save documents and occasional problems with the screen display after particularly heavy editing. It is also impossible to pour text and graphics directly into PageMaker as you could with Works 1.0 because PageMaker does not directly support the Works 2.0 file format. You can save your work as text-only and place it in PageMaker, but of course, you lose all formatting, and you have to leave the graphics behind. For Works owners with Word 3.02 there is the option of saving files first in RTF format, which keeps the formatting; importing the RTF files into Word; and then placing the text into PageMaker, since it does directly support the Word format. However, the point is that you can no longer easily use Works 2.0 with PageMaker. Bugs notwithstanding, Works 2.0 is an impressive package and a bargain to boot. It's an ideal first software purchase for new Mac owners; many will never outgrow it. *—George Beekman (with research by Eric Johnson)*

See *Where to Buy* for contact information.

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Graphics Overlay plots PostScript support for LaserWriter Export pict files *Two dimensional:* Error Bars Scatterplots Line and Vector Graphs Vector, Dot, Bubble and Quantile Plots Bar Graphs (single, multiple, stacked, range) Box plots (single and grouped) Stem-and-leaf diagrams Linear, quadratic, step, spline, polynomial, LOWESS, exponential smoothing Confidence Intervals and ellipsoids (any alpha value) Smooth mathematical functions Rectangular or polar coordinates Log and power scales ANOVA interaction plots Histograms (regular, cumulative, fuzzy) Stripe and jitter plots Gaussian histogram smoothing Scatterplot matrices Voronoi Tesselations Minimum spanning tree Maps with geographic projections (U.S. state boundary file included) Chernoff faces Star pilots Fourier plots Pie charts Contour plots on regularly and irregularly spaced points Control charts and limits *Three dimensional:* Data plots Smooth function plots Vector plots Linear, quadratic, spline, least squares surface smoothing Three-dimensional type fonts.

Statistics Basic statistics, frequencies, t-tests, post-hoc tests Multiway crosstabs with log-linear modeling, association coefficients, PRE statistics, asymptotic standard errors Nonparametric statistics (sign, Runs, Wilcoxon, Kruskal-Wallis, Friedman two-way ANOVA, Mann-Whitney U, Kolmogorov-Smirnov, Lilliefors, Kendall coefficient of concordance) Pairwise/listwise missing value correlation, SSCP, covariance, Spearman, Gamma, Kendall Tau, Euclidean distances Linear, polynomial, multiple, stepwise, weighted regression with extended diagnostics Multivariate general linear model includes multi-way ANOVA, ANOCOVA, MANOVA, repeated measures, canonical correlation Principal components, rotations, components scores Multidimensional scaling Multiple and canonical discriminant analysis, Bayesian classification Cluster analysis (hierarchical, single, average, complete, median, centroid linkage, k-means, cases, variables) Time series (smoothers, seasonal and nonseasonal ARIMA, ACF, PACF, CCF, transformations, Fourier analysis) Nonlinear estimation (nonlinear regression, maximum likelihood estimation, and more).

Data Management Spreadsheet data editor with row/column cut and paste Transformations executed via menus and dialog boxes Import/export test files Missing data, arrays, character variables Character, numeric, and nested sorts Subgroup processing with SELECT and BY Value lables and RECODE statements Unlimited cases.

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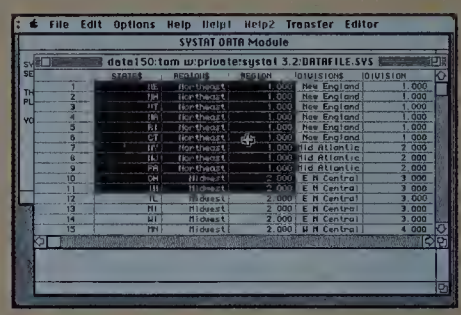
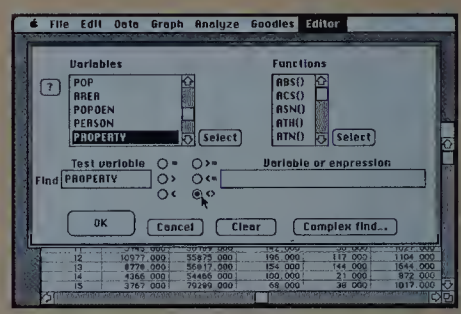
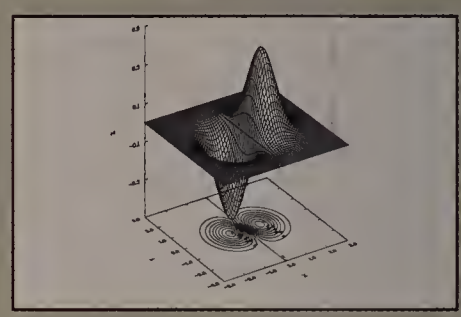
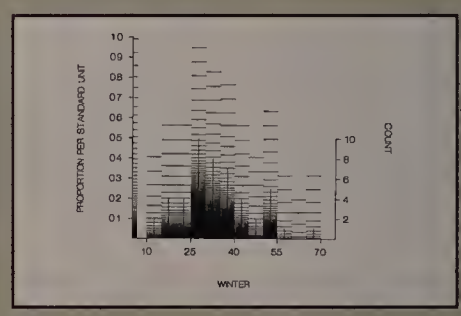
Mac screens

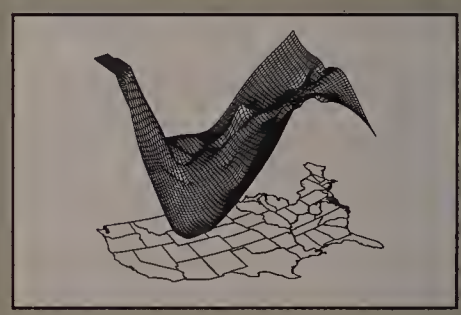


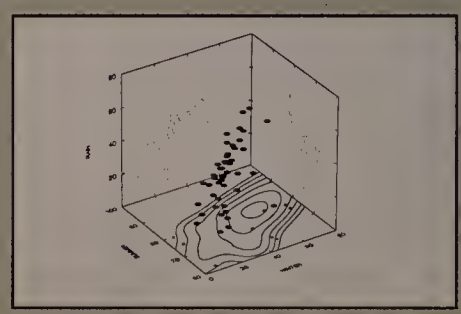


LaserWriter™ graphics









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StarDrive 60TX

SCSI 60MB tape drive with StarTape 3.0. ***Pros:*** *Quiet, efficient, easy to use.* ***Cons:*** *Nonstandard tape format; limited single-user and network options.* ***Company:*** *Ruby Systems.* ***List price:*** *$990 (includes terminators, interface, power cables, and two blank cassette tapes; with User Group discount $697).* ***Requires:*** *512KE; SCSI port.*

MARK JOHANN

StarDrive 60TX *The StarDrive 60TX is designed to fit comfortably underneath a Mac Plus, an SE, or under the Mac II monitor.*

Ruby Systems' StarDrive 60TX is an efficient, low-cost tape backup drive. As long as you have no need to read from or write to Apple-standard drives or do extensive network backups, the StarDrive is quiet, fast, and easy to use.

Desktop Quiet

Installation is as simple as plugging in the cables, adjusting the SCSI port setting with a click of a switch, and copying the StarTape program onto your hard disk. The drive is so quiet when idling that it's difficult to tell whether or not it is on. Even when the tape is streaming, the sound level is barely above that of an audiotape rewinding.

I tested the 60TX on a nonnetworked Mac Plus with a DataFrame XP 20 hard disk, and on a Mac II with 2 megabytes of memory and a 40MB Apple hard disk on a version 2.01 AppleShare network with two Giga Cell DataFile 150 tape drives as servers. In both cases I was using System 6.0.1, Finder 6.0.2, and MultiFinder 6.0.1.

StarTape

The StarTape software offers complete, select, or incremental backup. The complete, or mirror image, backup runs at nearly 4MB per minute; the select and incremental backups, at almost 2MB per minute. By comparison, the fastest floppy-based backup programs (PC Tools and FastBack) barely crack 1MB per minute, not counting the time it takes to insert all those floppy disks.

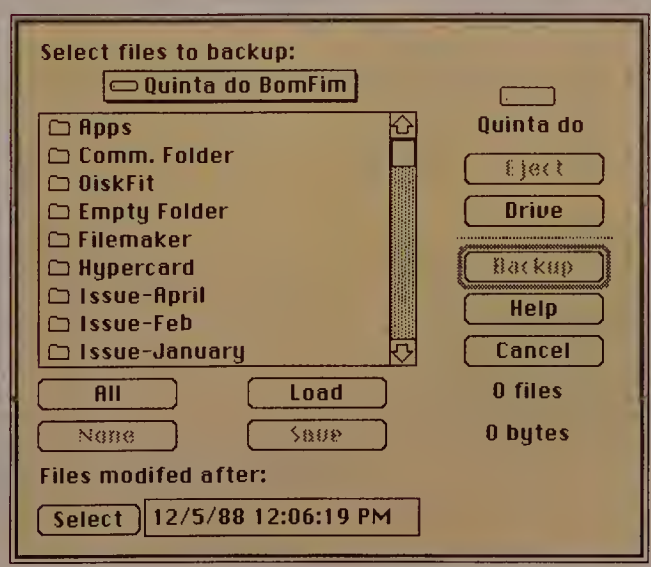
It is easy to create a temporary or scripted backup set and know immediately how much data and exactly which files you are backing up (see "File-by-File Selection"). Optional passwords for individual tapes or backup sets write-protect the tape but you don't need to use them in order to restore a crashed disk.

Not Really Made for Networks

It's best to use a Ruby StarDrive 60TX with a Mac Plus or SE since it rests comfortably under either one. Under a Mac II monitor, however, the shielding in both components may not be adequate to ensure separation of their respective electromagnetic fields.

Ruby supports the 60TX running under TOPS, but at press time the company had not yet tested it under AppleShare. I did. The 60TX was inconsistent in its ability to find all the files on the server that I selected for backup. The 60TX also crashed when running AppleShare with MultiFinder on a 2MB machine because it ran out of memory.

Although LocalTalk's painfully slow data-transfer rate is primarily to blame, the 60TX took nearly ten minutes to read through 80MB of data on the server to select files for backup, and then almost one minute per megabyte for the actual backup. While not as laborious as backing up a single-user system with floppies, this process is just as time-consuming. In addition, StarTape cannot do a mirror-image backup or back up multiple volumes in one session over a network.



File-by-File Selection *StarTape automatically selects files modified after a specified date and time, and by selecting folders and files you can define and save backup sets to speed up your regular backup sessions.*

Reliable Performance, No Frills

This product is a solid, no-frills performer. I sorely missed, however, the option to cancel a backup once it had begun. Although somewhat lacking in overall technical information and missing an index, the documentation is well organized for general use with step-by-step, easy-to-follow procedures, suggested backup strategies, and precautionary advice. The Teac CT-500 or CT-600 cassettes that the unit requires were difficult to find at local computer supply houses, but they can be ordered directly from Ruby Systems for $20 to $25 each. And the drive's QIC-36 format does not read or write from the QIC-100 format that Apple has tried to establish as a standard for tape backup devices.

I was assured by the consistently friendly, helpful people at the other end of the toll-free support line that the next release of StarTape will include the ability to overwrite existing files instead of having to write the backup data to a separate folder. As it stands now, tapes cannot be overwritten, only appended. Ruby Systems has quite wisely erred on the side of overprotecting its user base. The company's assumption is that the Restore function is reserved for those occasions when something has gone wrong with your hard disk and you have to reformat it. In the best of all possible worlds, you will never have to use Restore. If the worst happens, however, the 60TX offers efficiency, ease of use, and all the basic functions required of a single-user backup system.—*Nancy Canning*

See *Where to Buy* for contact information.

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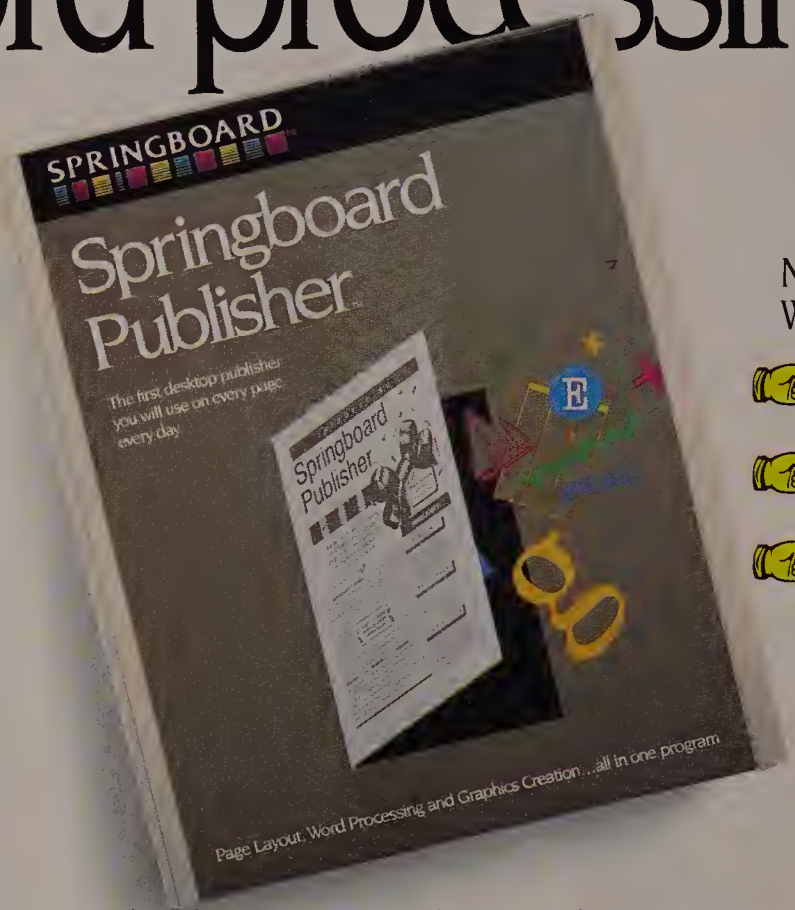

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Gofer 1.0

Text-finding DA. ***Pros:*** *Searches files of many different types; fast; searches in the background; has excellent search criteria.* ***Cons:*** *Large for a desk accessory; not always successful in filtering out extraneous characters.* ***Company:*** *Microlytics.* ***List price:*** *$79.95.* ***Requires:*** *512KE.*

Gofer is a desk accessory that searches quickly through the files on a hard disk, looking for the text that you want, looking in the files where you want it to look, and putting what it finds on the screen or in a text file.

This Gofer Isn't Vermin

Unlike its furry namesake, you'll be happy to have this Gofer around. To start a search, you need to tell the program three things: what to search for, where to look for it, and how to process the results. You can choose from three kinds of search. The Simple search, which is the default choice, finds just the text you type (or paste) into the text entry box. For a more refined search, clicking the And, Or, Not, Nearby button makes several new text boxes and radio buttons appear (see "What Do You Want?"). You can then type in additional text choices to narrow down the search, using Boolean logic. For example, say you have several membership lists from various organizations and each list also has a brief description of that organization's goals. You want to find out which organizations John or Mary Smith belongs to, but you don't want to include any religious affiliations. A Boolean search for these criteria would look like this: **John Smith OR Mary Smith NOT religion OR church**. The final type of search is a Browse. When Browsing, you don't need to tell the program to find anything specific; it makes every file available for copying.

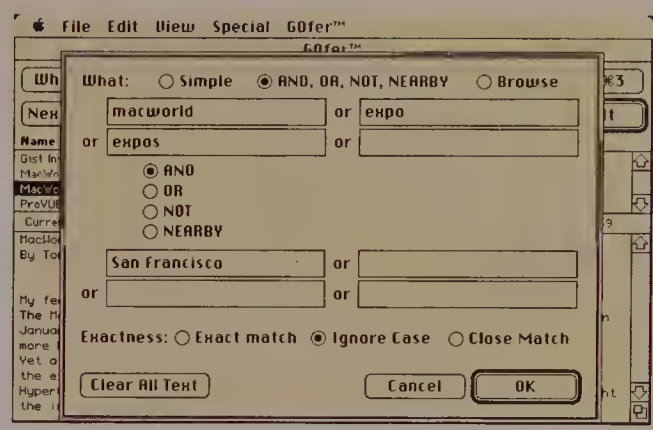
You tell Gofer which folders to search by selecting the Where button. A file selection window appears that lists files and folders by category, size, kind, and modification date. Clicking on a category name sorts the list by that category. You can choose files or folders from the list, including or excluding them using the usual click-Shift-click-and-drag technique or the Select All button. With the extremely flexible Where options you can search everything, search only certain kinds of files, search everything except certain kinds of files, skip applications and read only documents, and even tell Gofer to look only in files or folders that contain a particular name or part of a name. Gofer remembers these settings, so you need to customize your search pattern just once.

The last step is to tell the program what to do with what it finds. The How dialog box lets you tell Gofer to show each find in the main Gofer window, or write the finds to a text file. Gofer tags found text with the name of the file it was found in and the path to that file, and Gofer includes a user-specified number of lines before and after the found text, for context.

It's Fast, It's Easy

The whole process takes a lot less time to do than to explain; in operation Gofer is fast and almost effortless to use. It found 49 instances of the word *Macworld,* searching through 597 files taking up more than 9 megabytes, in just over six minutes. Once Gofer completes its search, it displays the first find in the last file searched (see "Tracking Down Text"). You can select and copy to the Clipboard any or all of the file displayed, and the program allows you to add to the contents of the Clipboard with the Copy More command. This is a great feature; it lets you stay in Gofer, building up the Clipboard with text that you want. You can then paste it all into an application, avoiding the need to copy, switch to the application, paste, and switch back to Gofer for more text. You can also do a simple find for a text string within one of the found files by using the SubSearch command.

The program can search in the background, whether or not you're running MultiFinder. The search slows down considerably while in background mode, but you can still continue to work while Gofer is searching behind the scenes.



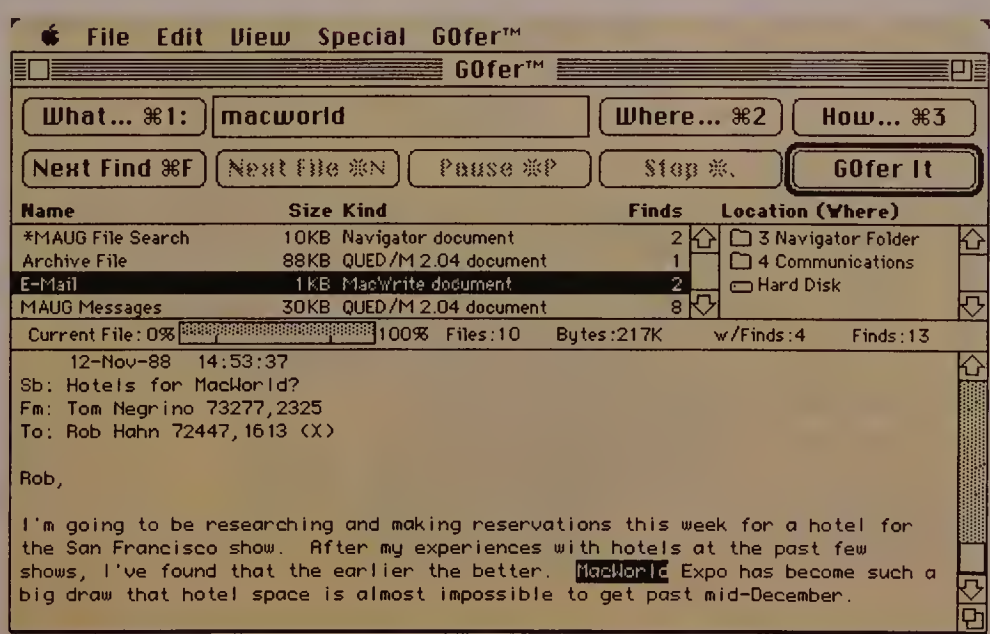
What Do You Want?
In this test, Gofer finds files that contain the text macworld *and* expo *or* expos *and* San Francisco. *You don't have to capitalize the text you enter for the search.*

Rough Spots

Gofer does have some problems. Built into the program are several text filters, which screen out extraneous formatting characters from searched files. The version of Gofer I reviewed did not have adequate filters for FullWrite Professional or Word Perfect files, so the results of a search in these documents were frequently full of garbage characters. Microlytics will provide a free update for registered owners on request.

Gofer is a DA that quickly makes itself indispensable. It does most of the functions of specialized text-retrieval programs that cost many times more, and it's fast and easy to use. It will quickly earn a place on your Apple menu.—*Tom Negrino*

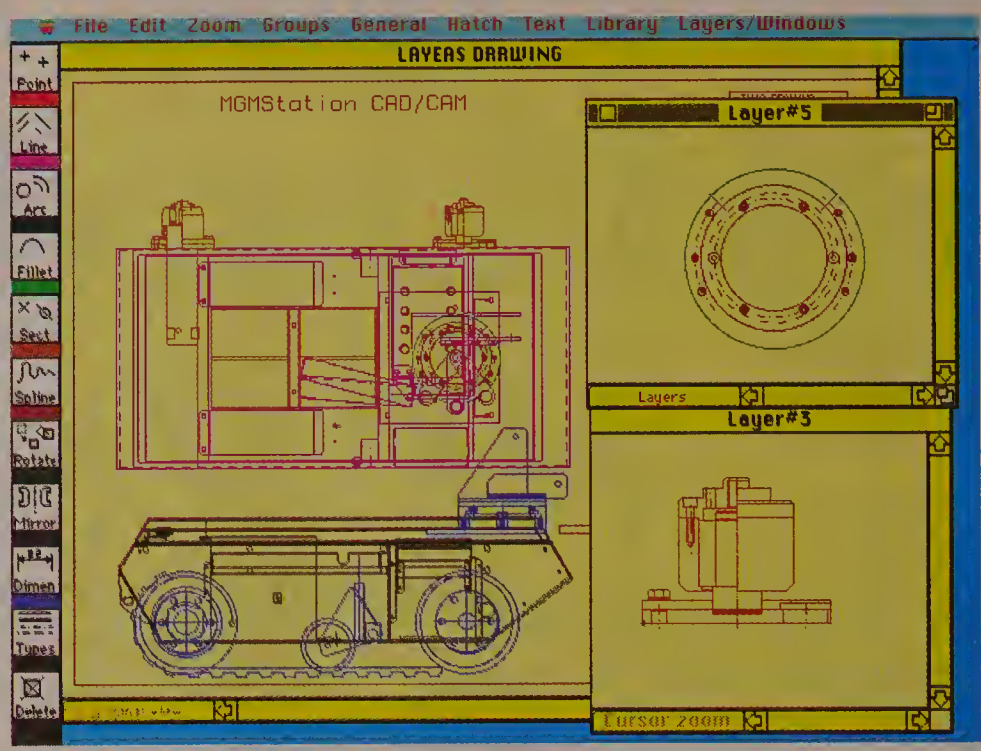
See *Where to Buy* for contact information.



Tracking Down Text *The main Gofer window shows the results of a search. The bottom part of the screen contains the found text, which you can select and copy to the Clipboard.*

MGMStation 2.5

Computer-aided design and drafting package. ***Pros:*** *Color display and output; precise control over dimensions, scaling, and text placement; can cut, copy, and paste within MGMStation windows and between other applications; offers true layering.* ***Cons:*** *Limited macros; no 3-D capabilities; nonstandard Macintosh interface.* ***Company:*** *Micro CAD/CAM.* ***List price:*** *$999 (2.5 I, monochrome); $1399 (2.5 II, color).* ***Requires:*** *1MB for monochrome; 1MB with Mac II for color.*



Layers and Windows
MGMStation supports an unlimited number of layers and windows. The contents of any layer are easily displayed in a new window.

Computer-aided design and drafting (CADD) packages can vastly improve productivity by making short work of repetitive drawing tasks, eliminating hand calculations, and significantly reducing editing time. But to realize these gains, the software must provide quick access to hundreds of sophisticated functions. That's one of the many benefits that MGMStation provides.

Recent improvements to Micro CAD/CAM's package make a top performer much stronger (see "Benchmark: Mechanical CAD," *Macworld,* November 1987). The most significant changes include a substantial increase in speed, true layering, expanded options for keyboard entry, and multiple windows. These enhancements help MGMStation outdistance other high-end systems—such as AutoCAD on the IBM PC and the Mac version of VersaCAD—in most drawing tasks.

Precision Drafting

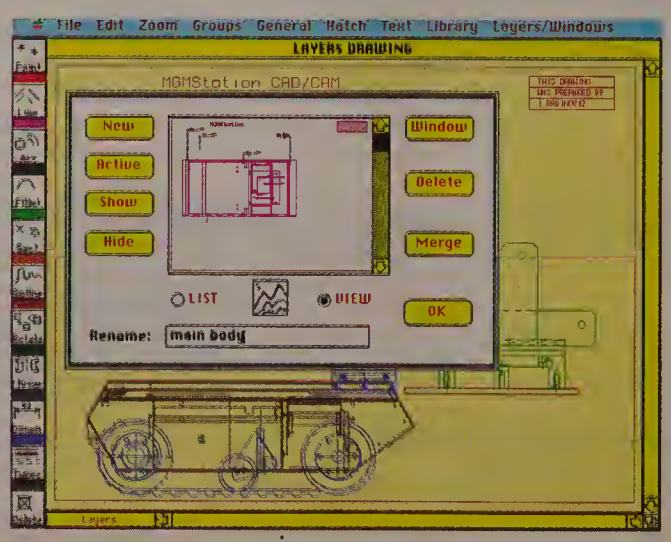
MGMStation is one of the few CAD packages that uses 16-place floating-point calculations—a requirement for tight-tolerance machined parts. Then there's its raw speed. MGMStation 2.5 for the Mac II works almost twice as fast as the previous version, 2.09. Zooming from full view to 10:1 magnification, for example, is eight times faster than with VersaCAD: VersaCAD took 16 seconds and MGMStation, 2 seconds.

The user interface is a departure from the Macintosh norm. Selecting one of the ten toolbox icons on the left of the screen, for example, reveals a menu of specific commands for drawing lines or arcs. A function stays active until you escape by sliding the cursor into the side menu area, a feature that speeds up repetitive drawing.

The standard Macintosh menu bar is often replaced by data entry or dialog boxes. Once a command is executed, the standard menu bar automatically returns—resulting in maximum design space.

With approximately 200 functions, MGMStation 2.5 gives you the tools and flexibility to handle most mechanical design tasks. First, you define the drawing size according to ANSI or ISO standards, or enter a custom paper size. Scaling is automatically adjusted according to English or metric units.

Next, you specify points freehand, by typing absolute or polar coordinates, or by placing a point on a custom gridwork. You draw lines to points you've determined, or have MGMStation calculate a spot on existing lines and arcs.



Layers Management
Layers management is accomplished through a dialog box that lets you view the contents of each layer graphically. An icon indicates whether the layer is Shown, Active, or Hidden.

Then you use the Contour Offset command to duplicate the pattern at a specified distance from the original, which is valuable for indicating the width of a drill or other tool during machining.

MGMStation also includes options for drafting circles and arcs, and for placing dimensions. For example, Fillets rounds all corners of an entity. The program is also especially adept at executing mirroring, splines, chamfering, tangent lines, and arcs—all in a variety of line colors, widths, and patterns.

Creating cross-hatching as fills is extremely easy in MGMStation. You just click on the shape to be shaded and specify the pattern. Hatching lines can be rotated to any angle, their thickness or pattern changed, and their color varied.

Enhanced Editing

The addition of cut/copy/paste capabilities and layering eliminates MGMStation's few serious limitations. Previously, you had to group elements to duplicate or move them—and then ungroup sections for editing. Now, you can quickly select a drawing area, copy it to the Clipboard, and paste it elsewhere into the same drawing or another window. Moreover, you can scale the Clipboard with accuracy, which makes it simple to insert drawings into other programs. And when parts of a drawing are copied or pasted, you can effort-

(continues)

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Circle 173 on reader service card

lessly eliminate lines or whole sections by clicking on the extraneous elements.

The way MGMStation implements layering is especially impressive. Not only can you view layer names within a dialog box —and rearrange them in any order—but a graphic of the layer appears as you scroll. No more guessing at what attributes are assigned to a particular layer. As a layer is selected it can be inserted into a new window, a valuable feature if you use common parts or formats in different drawings. As with groups, you can make a layer active, view-only, or invisible. There's no limit to the number of layers available.

Finishing Touches

MGMStation's text editor has been modified substantially. You can place text in a table, balloon, frame, or on a pedestal complete with a line to a selected point; as you move the text, the indicator line will continue pointing to the selected item. You can also import larger text blocks from a word processor or the Clipboard.

Using a BASIC-like language, MGMStation now incorporates macros. The coding recognizes menu and icon selections and prompts for user input through custom dialog boxes. Although they still need some refinement, these macros will be adequate for most tasks.

Closing the Manufacturing Loop

Not surprisingly, MGMStation can be integrated into a manufacturing environment with milling, turning, and punching modules. What's unusual is that MGMStation rivals minicomputer CAM and some mainframe CAM applications. These optional modules let you create CNC (Computer Numeric Control) programs directly from drawings and simulate results before committing the piece to manufacture.

MGMStation also integrates well with other applications. An optional translator lets you move drawings between IGES, DXF, or PICT formats. Several large firms use this feature to send MGMStation drawings to mainframe systems and to other microcomputer CAD programs including PC AutoCAD. Additionally, a number of good symbol libraries are available from Compu-Arch in Beverly Hills, California.

MGMStation shows a maturity that stems from earlier implementations on the Lisa. Simplified editing reduces reliance on the somewhat cumbersome group commands. Enhanced text capabilities, more options for placing dimensioned text, and improved plotter drivers (which are included) contribute to precise, high-quality drawings. The layering and windowing implementations are excellent. About the only item missing is 3-D, not a significant shortcoming when you consider MGMStation's price and file-transfer ability.—*Mike Heck*

See *Where to Buy* for contact information.

Color Scanners

Sharp JX-450 Color Scanner. ***Pros:*** *Versatile, programmable, high-resolution (up to 300 dpi) color scanner; variety of options; good results.* ***Cons:*** *Bundled software inadequate for extensive use.* ***Company:*** *Sharp Electronics.* ***List price:*** *$6995.* ***Requires:*** *Hard disk; 4MB of memory (5MB to 8MB recommended).*

Scanmaster. ***Pros:*** *Versatile, programmable, high-resolution (up to 300 dpi) color scanner; variety of options; good results.* ***Cons:*** *Documentation not thorough or well organized; bundled software inadequate for extensive use.* ***Company:*** *Howtek.* ***List price:*** *$8195.* ***Requires:*** *Hard disk; 4MB of memory (5MB to 8MB recommended).*

Not too surprising in these days of OEMs (Original Equipment Manufacturers) and second sourcing, these two scanners differ very little. Their hardware and National Semiconductor interface boards are identical. Even their accompanying software—except for the scanning programs—is the same.

Identical Hardware

As seems to be the case with most color-based hardware, the Sharp and Howtek Color Scanners are a bit larger (22 inches wide by 21 inches long by 7 inches high) and heavier (roughly 55 pounds) than the current crop of black-and-white scanners. The Scanmaster and the Sharp JX-450 are moving-bed scanners: the scanning lamp is fixed, and the top part of the scanner moves up to 8 inches in both directions when scanning. Keep that in mind when you decide where to install one.

The scanners, designed to be completely controlled by a Macintosh, have no controls other than an on/off switch. However—in a welcome departure from many of the black-and-white scanners—they do have a series of green LED indicators on the front. These indicate readiness, scan mode (color, halftone, black and white), fast scanning, and resolution (300, 200, 150, 100, or 75 dots per inch).

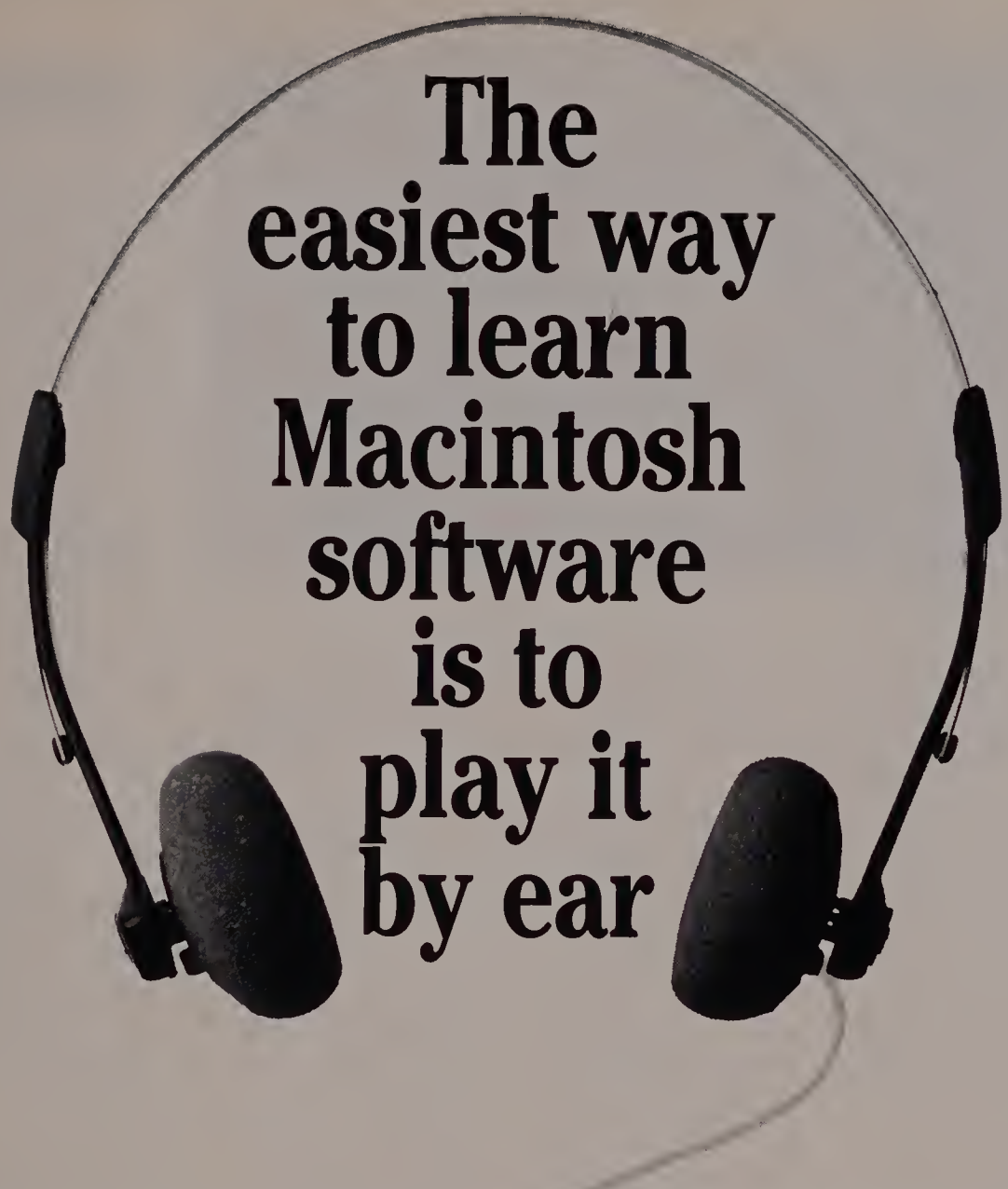
The scanners themselves are a hacker's delight; they can be controlled with commands in the form of character strings that you send via the Mac. Scanning resolution is user selectable, from 30 to 300 dots per inch (dpi), with fractional resolutions allowed. A number of predefined scan sizes (such as legal, letter, and A4) are available, and the corresponding placement is marked on the scanning surface. And, of course, you can define your own scan size. You can also choose other scanning settings (scan rate, gradation, zoom, data correction, output data format). Average users will not care about any of this, since the scanning application on the Mac is preset.

Both the Scanmaster and the Sharp JX-450 use an IEEE-488 (GPIB) bus interface to communicate with the computer. Because of that, you can hook them up to any computer with an IEEE-488 interface port or board. Both companies offer the National Semiconductor GPIB board for use of either scanner with a Mac II, as well as a special version for the Mac SE. With the GPIB you can hook up a number of other IEEE-488 devices in addition to a scanner.

(continues)

MARK JOHANS

Scanned Image
The image displayed in LaserPaint was captured as a 24-bit TIFF file using ChromaScan and the Howtek Scanmaster flatbed scanner.



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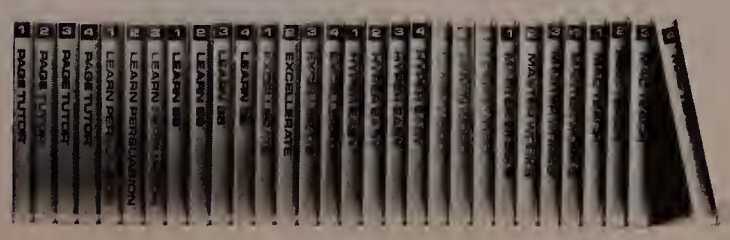

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MARK JOHANN

Little Difference *The Howtek Scanmaster (left) and the Sharp JX-450 Color Scanner (right) use identical National Semiconductor interface boards.*

Both scanners come with the same assortment of diagnostic, configuration, and driver programs. An INIT file that you drop into the System Folder lets the Mac system and programs talk to the GPIB board. The two software collections differ only in the general color scanning application bundled with each. The Sharp scanner comes with a program called PixelScan that greatly resembles Howtek's MacScan-It. Neither program is really adequate for full, convenient use of the color scanner, though both offer many special options (especially MacScan-It).

Imagenesis's ChromaScan program will enable you to exploit these color scanners. Designed to work with the Sharp scanner, it also works perfectly well with the Howtek. And while it lacks some of the specialized features of the bundled software, it works more reliably. The other two packages have problems saving files, are prone to crash at inopportune moments, and don't run unless the interface board is in the machine. ChromaScan, on the other hand, works even if the scanner isn't hooked up to a board in the machine. Its user interface (although a bit awkward) works a lot better than those found in MacScan-It or PixelScan. If you purchase either scanner, you should definitely buy ChromaScan as well.

All three packages offer various possibilities. You can scan images of various sizes, at various resolutions, and in a number of formats (black and white, gray scale, color). All three claim to support a RasterOps mode that lets you do a true 24-bits-per-pixel scan for display using the RasterOps 24-bit video board for the Mac II. However, a RasterOps-based system was not available for testing, so you should investigate such claims thoroughly before buying.

Should You Buy a Color Scanner?

The ultimate question remains: should you buy a color scanner at all? If you decide to, be prepared to spend a lot of money. First, you have to pay for the scanner itself and for its interface board, which should set you back a cool $7000, minimum. Second, you really need a Mac II (or Mac IIx) to get full use of a color scanner; if you use a Mac SE, you're better off getting a black-and-white scanner. Third, you're going to need at least 4MB to 5MB of memory and possibly more, depending upon the size and resolution of the images being scanned. Finally, you really need a large color monitor if you're going to scan anything but small pictures at low resolutions.

Given the expense involved, it's not clear what would justify the purchase of a color scanner. In larger institutional settings, a single scanner might be handy for scanning in color artwork to be used on the computer. Color separation—producing separate color scans of an image for printing purposes—is often cited as a reason to buy a scanner, but you're probably better off using regular color separation equipment.

In a few years, when prices have dropped and color laser printers are more widely used, color scanners will have broader application; for now, their uses are limited to specialized professional tasks. If you need one, though, consider the Sharp or the Howtek scanner . . . and be sure to pick up a copy of ChromaScan if you get either one. —*Bruce Webster*

See *Where to Buy* for contact information.

Canvas 2.0

Draw/paint program. ***Pros:*** *Full-featured draw and paint program plus color-blending facilities and layers.* ***Cons:*** *Doesn't print color separations.* ***Company:*** *Deneba Software.* ***List price:*** *$299.95.* ***Requires:*** *1MB; two 800K floppy drives or hard disk; System 6.0 or later version. 2MB recommended.*

Canvas 2.0 offers multilayering, fully manipulatable text blocks, object libraries, autodimensioning, and a full palette of colors. It also has advanced painting facilities, bezier curve line control, an autotrace tool, and a color palette manager with sophisticated blend and contrast controls—all for about $300.

Restretching the Canvas

The original Canvas (and Canvas DA) was the first paint/draw–combination program for the Macintosh. It translated objects to bitmaps, transformed low-resolution bitmaps (72 dpi) to high-resolution (2540 dpi), rotated text and graphics in 1-degree intervals, and zoomed into or away from an image in 32 levels. With up to a 9-by-9-foot work surface, it was large enough to design a billboard.

Today's Canvas smooths polygons, aligns objects to $^{1}/_{64,000}$ inch, and transforms images from bitmaps to objects or vice versa. But Canvas hasn't just been restretched; you can now address 256 colors and gray

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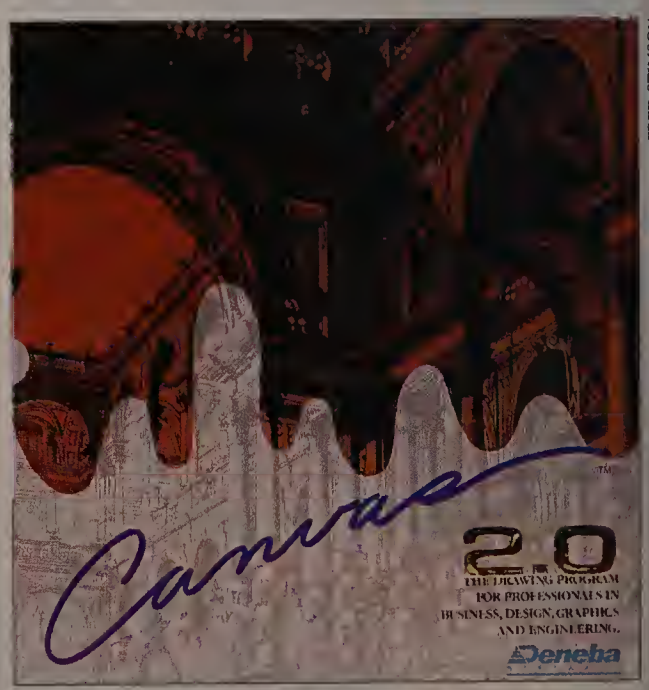

FRED STIMSON

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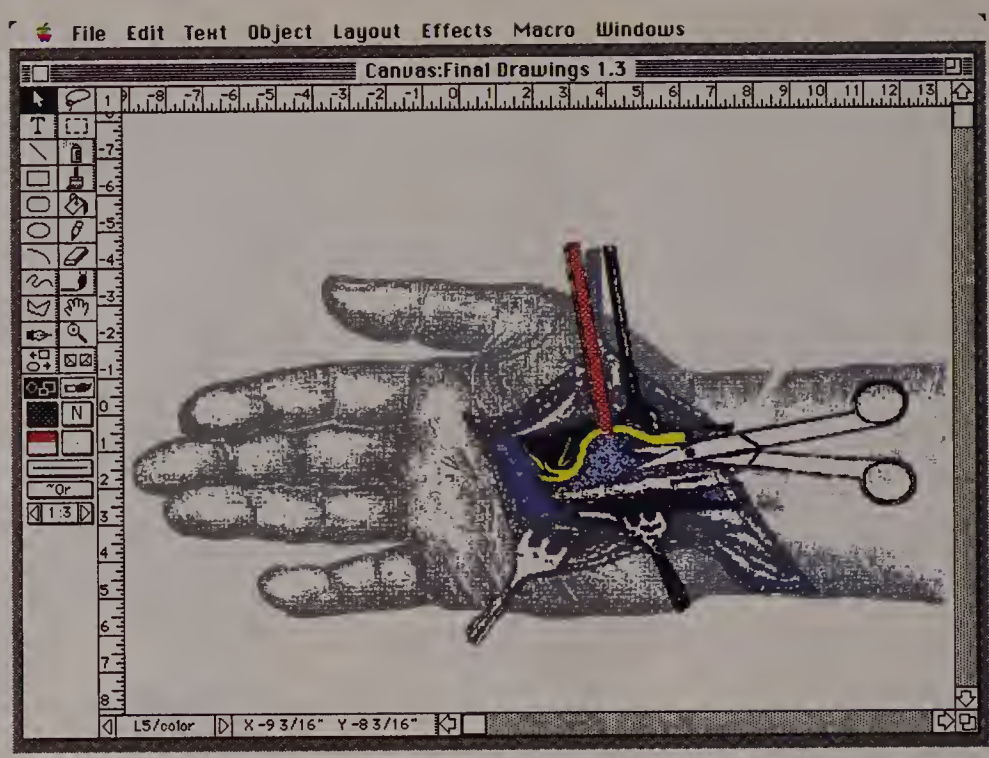


Layers
The final overlay of a six-image series showing a complicated surgical procedure. Each layer was copied and pasted into VideoWorks for the final animated presentation.

scales in 1-degree increments, construct an object in layers, and automatically dimension lines and arcs.

Draw or Paint?

Canvas 2.0's flexible layering system is invaluable (see "Layers"). This function enables you to add to a design without disturbing the work you have completed. In Canvas, layers can be named, moved, activated, or hidden, and dimmed (to a 50 percent gray) or colored. Canvas even lets you name, save, and recall different drawing views.

Canvas's draw functions are complete; all the object types, groupings, and modifications (open, smooth, reshape, align, group, and so forth) as well as the standard fills are available. Adding or deleting points to an open or closed, smoothed or unsmoothed path is fast and accurate.

Although Canvas is marketed as a draw program, the Canvas users I talked to were most intrigued by its paint features. With Canvas you can translate images into high-resolution bitmap format or one of 15 different dither options for pixel-by-pixel editing. But although it is more advanced than MacPaint, Canvas is not a full-featured paint program. Even though you can use a full standard or custom 256-color palette, each separate paint area is limited to one foreground and one background color.

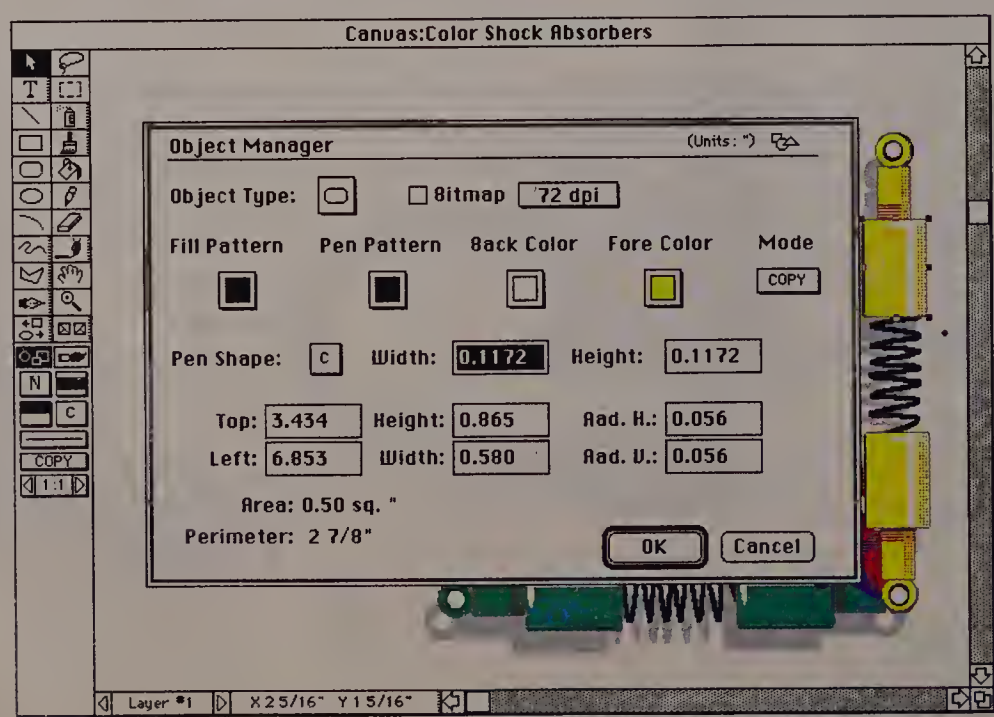
Mix and Mismatch

When you begin to mix and match paint and draw zones, Canvas can become confusing. The Tool Box is a cluttered combination of draw and paint tools. Line, color, pattern, and transfer options portrayed on the tool palette reflect general defaults, rather than your current selections. One way you can make changes to a selected object is by using the Object Manager dialog box, which reflects all current object attributes (see "Object Manager").

The Canvas surface can become just as unwieldy. A simple graphic design can quickly turn into a montage of draw and multiresolution bitmap zones. It's disconcerting to discover that although you can view a high-resolution bitmap at any magnification, the program only permits you to work on it at certain levels of magnification (which are displayed in boldface).

Canvas does not generate color separations, although Deneba is working on a color separator. You can get around the problem by placing separations on different layers and printing each layer individually. Printing overlapping objects can be a problem. Canvas relies on transfer modes to mix overlapping bitmaps and draw objects. Transfer modes determine whether an overlapping area will be opaque, transparent, reversed, or any combination of these. When translated to PostScript, each overlapping object is printed as an opaque entity. A Canvas PostScript option lets you see a file the way it will be printed on a PostScript printer.

Canvas opens MacPaint, MacDraw, PICT/PICT2, or TIFF documents and supports pastes from the Clipboard. It also allows you to save documents or specific layers within a document as MacPaint, PICT/PICT2, or TIFF files and to print only a selected object or layer.



Object Manager
The Object Manager dialog box reflects the selected object's attributes and lets you make changes to the object as well as change its resolution.

Drawing the Line

Graphics styles and tastes vary, and it's difficult to choose between the bitmap or the drawing approach. Canvas 2.0 lets you draw both ways and do it with flair as well as accuracy. Whether you require a full-fledged drawing program, need to modify an imported bitmapped image, or want to dabble in the color-blend and bezier options of a more advanced illustrator's tool, Canvas may be for you.—*Joost Romeu*

See *Where to Buy* for contact information.

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QuarkStyle 1.0

Designer templates for desktop publishers. ***Pros:*** *Contains a variety of distinctive template designs; short learning curve; combines page-layout tools with word processing features.* ***Cons:*** *Manuals lack necessary information on font installation and on how to unlock Style templates in QuarkXpress; not compatible with low-end laser printers.* ***Company:*** *Quark.* ***List price:*** *$295.* ***Requires:*** *1MB; LaserWriter Plus and hard disk recommended.*

QuarkStyle 1.0, a package of 71 templates from the makers of QuarkXpress, is an accessory for both experienced and novice desktop publishers. Created by eight prominent designers, it targets the corporate user, providing outlines for business reports, memos, business cards, stationery and letterheads, newsletters, party invitations, brochures, a book design, and even a sample notice to issue stock certificates. At first glance, QuarkStyle looks like Xpress; the same menus and tools appear on screen. The box interface is also the same—you must draw a text or graphic box on the page to define an active area before you can type, draw lines, or import a graphic image. The similarity ends here, however, because the tool to create high-quality typography is no longer in the menu—it is in the templates themselves.

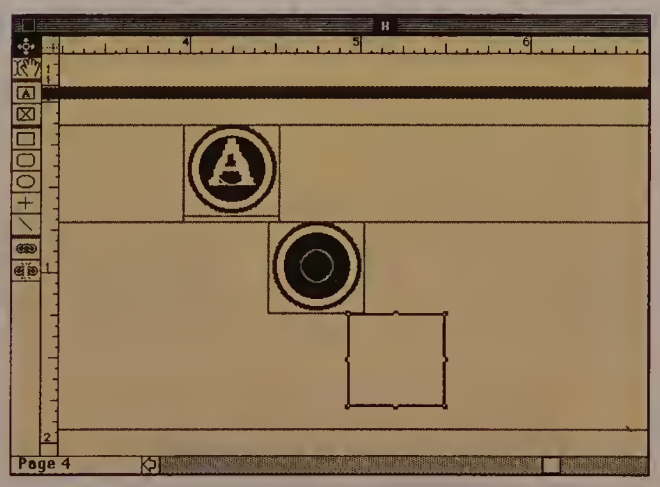
Although QuarkStyle works independent of Xpress, it combines many of Xpress's basic page-layout features, such as the ability to import and resize text and graphics, alter columns, and draw lines and boxes; it also has search-and-replace word processing features, a spelling checker, and an extensive hyphenation dictionary. By providing designer templates, QuarkStyle lets you bypass the complex typographical setup required by Xpress and puts you right to work in the format you want.

But Does It Work?

QuarkStyle attempts to blend design creativity with meeting the needs of the average Mac user. The compromise is to allow two options for every template—one created in an uncommon, or "designer," font, such as Bodoni or New Baskerville, and another version in the resident LaserWriter Plus font. Because I did not have the designer fonts installed in my system, however, all I could see were jagged, bitmapped versions of type in the templates. The only way that I was able to visualize the advanced designs was to refer to the printed examples in the manual. Also, it would have been helpful if some explanation of designer fonts had been included in the manuals.

The software works in conjunction with a PostScript printer and Adobe laser fonts only. Quark does not guarantee template reproduction with the bitmapped fonts of low-end laser printers using QuickDraw routines. In fact, all of the designs make use of the LaserWriter Plus, which has 11 resident typefaces, such as Avant Garde, Palatino, and Zapf Dingbats. If you have a standard LaserWriter with only four fonts (Courier, Helvetica, Symbol, and Times), you will have to purchase additional fonts to make full use of the templates.

Customizing a Design
The 17 letters of my own name will not fit in the box when I try to customize this letterhead design. To fix it, I have two choices. I can change the font to a smaller point size, but that will throw off the overall balance of the design. Instead, I can unlock the box containing my name and enlarge its overall size.



Find the Right Box
This graphic element is the centerpiece of another letterhead template. To substitute the first letter of your last name, you need to activate the box containing the letter rather than the background. Since it's in reverse video (white type on a black background), this graphic is composed of three layers of boxes.

Replacing Text

When you open a template, a page of dummy type stands out, showing you exactly what the intended line or paragraph should look like. You can see numerous graphic flourishes, such as small bold capital letters at the beginning of a sentence, throughout the template. This method allows you to work with intricate designs. On the other hand, I found it disconcerting to type over existing text. You can import text, of course, but it makes more sense to do that in the longer report or newsletter templates than in the business cards or letter stationery. It was also a painstaking task to replace the text in some of the more complex designs. What looks so simple and elegant on the page is actually several layers of active boxes clustered together. You must activate the correct box before you can retype.

Replacing graphics is a straightforward task. QuarkStyle lets you import TIFF and PICT graphic images. Many of the designs block out an area in gray for an image. Two of the templates come with their own graphics, which can be deleted.

A key feature is the ability to lock or unlock a box. A template may contain from 1 to 40 boxes, and each box is locked. A little padlock icon appears when you try to move or resize the box. You can unlock the boxes one at a time through the Item menu, but you cannot unlock the bottommost layer of master boxes. Unlocking the other boxes allows you to alter bits and pieces within the design, but you can't revamp the layout. For example, if you want to change a dropped capital letter in the beginning of a newsletter article, you can type in the new letter and then unlock the box it resides in. Once you resize this box, the surrounding text will reflow around the box and improve the text wrap. The only way to unlock a master box is to import the template into Xpress. In Xpress you can unlock and even create new templates.

(continues)

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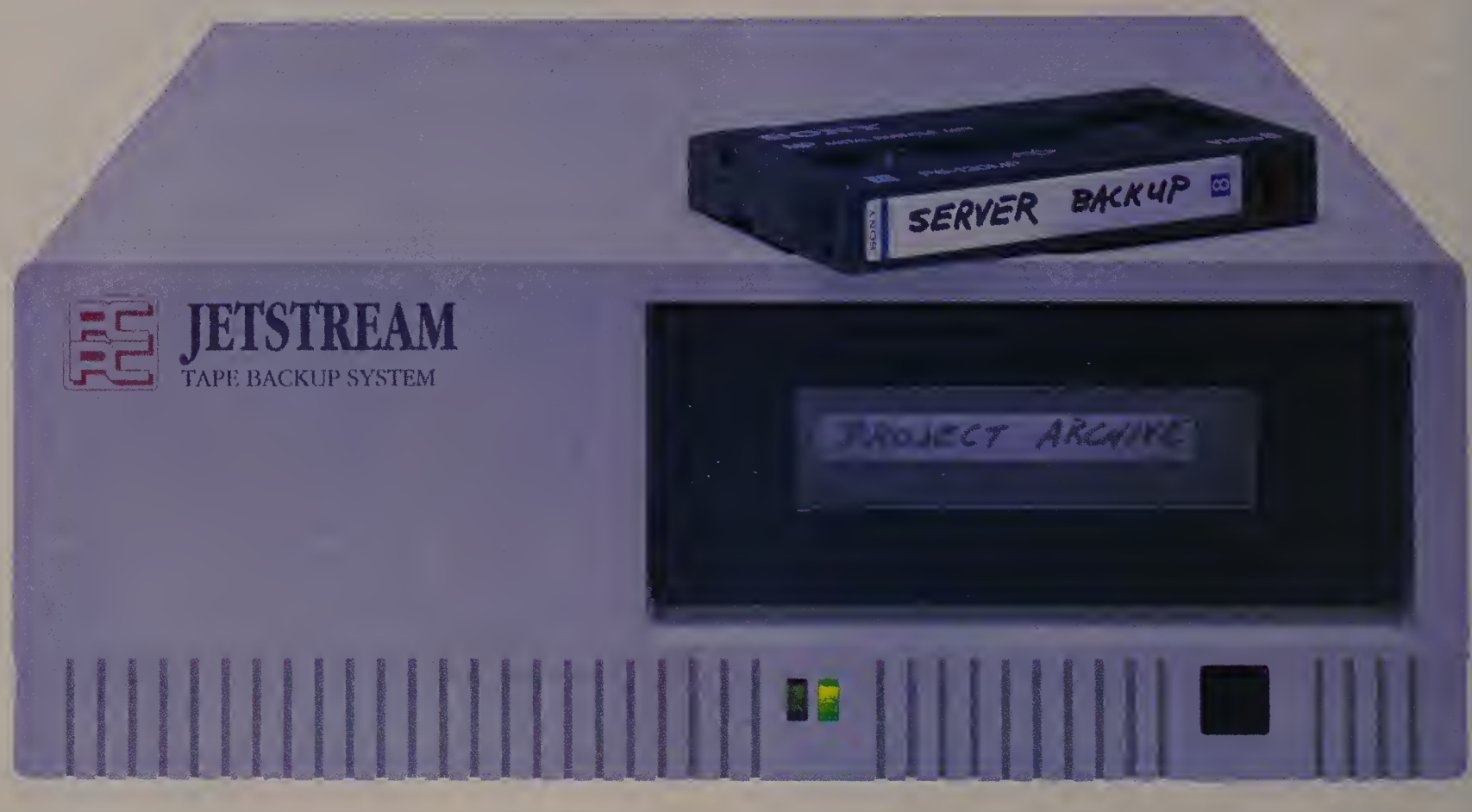

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To Buy or Not to Buy

QuarkStyle templates can eliminate the tedious work of producing common forms such as purchase orders, business cards, and letterheads. Working with both programs enables you to build special-order templates for your clients. There are also plans in the works to develop templates for different business fields, such as real estate and legal work. These improvements could make template packages even more popular than typesetting software.

QuarkStyle brings sophisticated designer templates that improve on the current crop of Helvetica clones to the beginning desktop publisher. But before QuarkStyle can stand on its own as an "instant publishing" program, Quark needs to focus more on the needs of beginners.
—Barbara Tannenbaum

See *Where to Buy* for contact information.

Stepping Out II

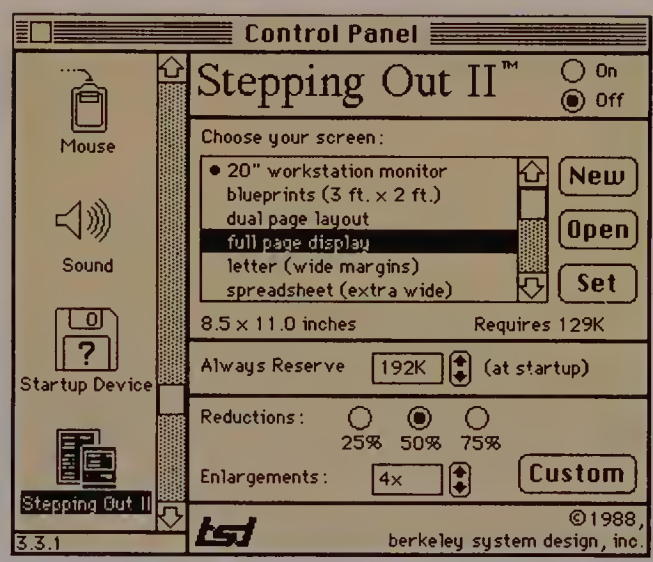
Large-screen display without a large screen monitor. ***Pros:*** *Gives you the effect of a larger monitor without the expense.* ***Cons:*** *Can conflict with INITs in your System Folder.* ***Company:*** *Berkeley System Design.* ***List price:*** *$95.* ***Requires:*** *1MB.*

I've never gotten over the rush I experienced the first time I used a full-page display. But unfortunately, not many of us can afford one. Berkeley System Design, once again, offers an inexpensive solution: Stepping Out II.

While the first version forced you to reboot to turn off the computer and reconfigure the screen, Stepping Out II is a CDEV (Control Panel device) that enables you to change screen size on the fly.

What's a Virtual Screen?

Stepping Out II creates a virtual screen of any size up to 116 inches wide and 65 inches tall on your Macintosh Plus, SE, or II. How can you have a 116-by-65-inch monitor when your physical screen is only 9 inches? The larger screen is displayed in memory; the small screen quickly pans the large screen as it follows the cursor.



Stepping Out
The Stepping Out CDEV appears in the Control Panel window. The scrolling window lists the available predefined monitors. The size and memory requirements for the selected screen appear below the window.

You can choose your monitor size from one of the seven preset screens: 20-inch workstation monitor, blueprints (3 feet by 2 feet), dual-page layout, full-page display, letter (wide margins), worksheet (extra wide), or standard Mac II monitor; or you can set your own. The New button opens a screen definition dialog box that allows you to set the size of your screen by dragging the handle of the screen-size box.

Whenever you select a screen size, its pixel dimensions and the RAM required are displayed. If you have sufficient memory, you can change screens automatically; otherwise you have to restart. An Always Reserve (at startup) selector lets you reserve the memory you need for a larger screen at the time you start up.

If you don't want to run Stepping Out in certain applications, the QuickStart feature lets you reserve the memory you need for a screen so you can turn off Stepping Out. Then as you launch the program you want to use with Stepping Out, you hold down the Option key to invoke it. The only drawback to QuickStart is that it doesn't work with MultiFinder.

Zooming In and Out

The magnifying glass is one of Stepping Out's best features. You can set the amount of enlargement and reduction from the Control Panel, and you can automatically zoom in or out, while working on a word processing document, the same way you change views in PageMaker. You can also magnify the area around the cursor from 2 to 16 times.

Several new features help you use a small screen to look at a large window. The Custom dialog box gives you many options. For example, you can have the screen follow the insertion point. If you are typing and your document extends beyond the edge of the screen, the screen pans to stay with the insertion point. And you can have the screen follow the active window. You can also lock the view, useful if you want to work on an area of your drawing or document and not have to worry about the screen panning when you get near the edge. If you open a dialog box while you are working, the screen moves to the box. Or you can also have the menu bar stay at the top of the screen (not pan with the screen) so that no matter where you are in a document, the menu commands are within reach. The size of the menu area can be adjusted, for example, so that the formula bar in Excel or the pattern palette in SuperPaint will always be available.

Stepping Out II is compatible with MultiFinder and works with some large monitors for the Plus and SE. It works with the Macintosh II and supports 24-bit color.

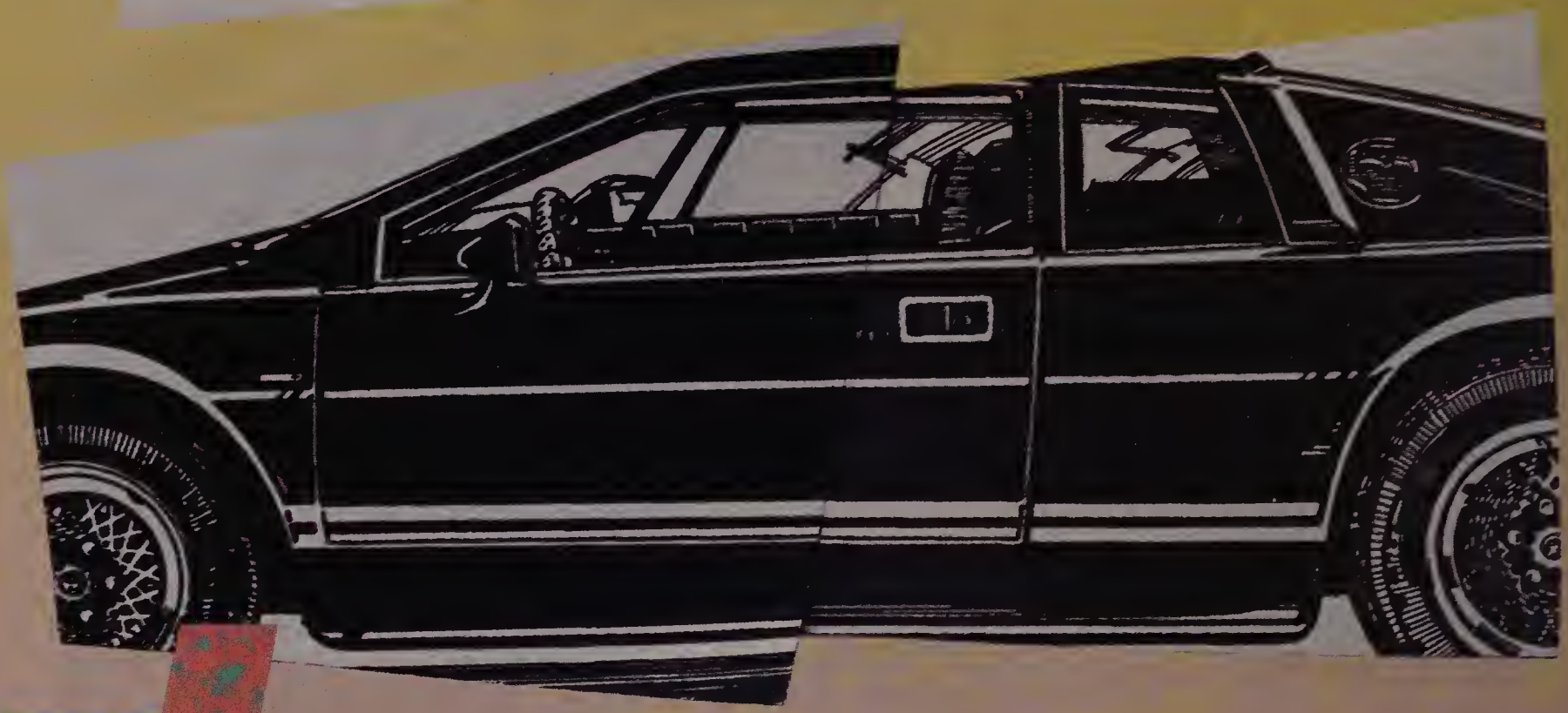
War and Peace?

The battles that INITs and CDEVs sometimes rage in your System Folder can be annoying. Because Stepping Out II is a CDEV and installs itself at start-up in alphabetical order along with the INITs, you can have problems. Fortunately, Stepping Out is compatible with most programs. Even though the Stepping Out manual warns that it isn't compatible with some menu clocks and screen blankers, the program worked well with Itty Bitty's AutoBlack 1.5 (shareware), Fifth Generation's Pyro 1.5, and Steve Christensen's new SuperClock 2.9 (freeware) CDEV.

Because a large virtual screen requires additional memory, Berkeley System Design does not recommend that you use Stepping Out II with a Macintosh 512KE. The company has upgraded the original Stepping Out to be compatible with System 4.1/Finder 5.5 or later, and recommends that 512K and 512KE owners use that System. Stepping Out II works well within 1-megabyte limitations as long as you remember that color uses two to eight times more memory than black and white. If you cannot afford a larger screen, then Stepping Out II may be an affordable answer.
—Fred Terry

See *Where to Buy* for contact information.

These unretouched print samples show the superior print quality of QMS-PS 810 over printers using first-generation print engines.



ntroducing the PostScript laser printer that blacks out at high speeds.

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–Publish! November 1988

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The QMS-PS 810 laser printer is easy to use, maintain, and comes with a one-year warranty. It's available from Laser Connection dealers. Laser Connection is a sales and marketing subsidiary of QMS. For the dealer nearest you call **1-800-523-2696.**

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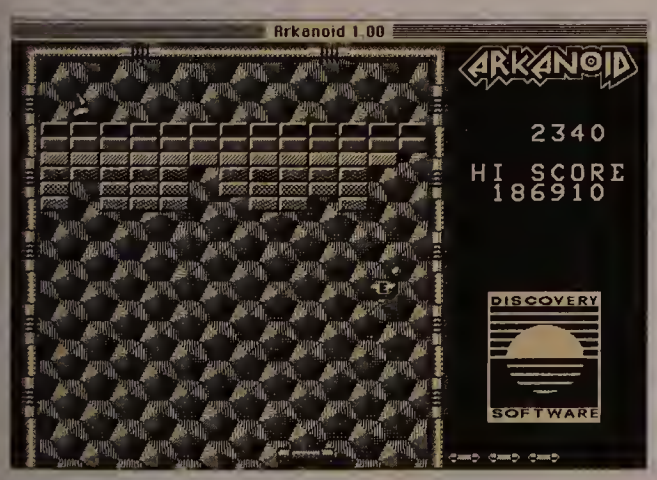
Circle 104 on reader service card

Arkanoid 1.0

Arcade-type game. ***Pros:*** *Fast, smooth, responsive action; challenging, exciting play.* ***Cons:*** *Distracting background patterns; skimpy documentation; must boot from System on Arkanoid's 800K disk.* ***Company:*** *Discovery Software International.* ***List price:*** *$49.95.* ***Requires:*** *512KE.*

Someday science will give a name to the curious state of consciousness that video games can induce. It's a mix of meditative calm and hyper-alertness. Maybe it's because play in general tends to re-create a feeling of childlike energy. Or maybe there's just something about staring at the screen looking at little bouncing things . . .

Arkanoid, based on a coin-op arcade classic originally created by Japan's video-game giant Taito, is definitely one of those calming/energizing games. Discovery has ported Arkanoid smoothly and expertly to the Mac—and so faithfully that it prompts you, at game's end, "To continue game, insert additional coins or click your mouse button before the timer reaches 0." As in an arcade game, the action is as smooth and responsive as can be. It's the best I have experienced on the Macintosh; there is none of the irritating understeer of a Lode Runner or a Maze Wars, or the hard-to-master bounciness of a Crystal Quest. You move the mouse, and the *vaus* moves with it.



Round One
The vaus is at the bottom of the screen; the ball appears just above and to the right of the falling E *capsule. A Konerd sits atop the formation of bricks (at left). The three small vauses at lower right indicate that the player has three lives remaining.*

FRED STIMSON

What's a Vaus?

The vaus is the paddle. Arkanoid is a classic brick-and-paddle game like the old Breakout. You move the paddle back and forth across the bottom of the screen to hit a bouncing ball that breaks apart a formation of bricks. When you break through the brick barrier and get the ball up on the top of the bricks it careens around, quickly destroying several bricks before bouncing back down to the vaus. It's also possible (with much practice) to put English on the ball and aim it through gaps in the bricks.

When you've cleared the screen of bricks, you move to the next level and a new, more difficult, arrangement of bricks. Various types of bricks have different point values and different characteristics: one kind is indestructible, one kind releases power capsules, and there are many others.

If you can catch a power capsule (without having it distract you into missing the ball), the vaus acquires new powers. Each capsule has a letter on its side that stands for a power; for instance, *L,* for laser, turns the vaus into a formidable brick-blasting gun; *E,* for extend, elongates the vaus; *D,* for door, warps you into the next level.

Other assorted entities fall into the area of play. Some look like the walking molecules from the simulation program Life, and some are mean little geometrical shapes. These characters have names like Whirling Konerds, Opopos, and Pyradoks; they are not mentioned in the manual, but on the back of Arkanoid's box it says you must "dodge and destroy [them] or be destroyed!" I found in play, however, after carefully avoiding these critters for several dozen games, that they're quite harmless.

When you start, you can pick from four difficulty levels, choose whether to play a one-player or a two-player game, and select how many lives you want. A unique feature of the game is the minimal speed mode (which is toggled on and off with the *T* key), created especially for people with disabilities that affect reflexes or dexterity. Like an arcade game, Arkanoid includes a high-score table (but you must start by clicking on the Arkanoid High Score icon, rather than on the ordinary Arkanoid icon, if you want your high scores saved).

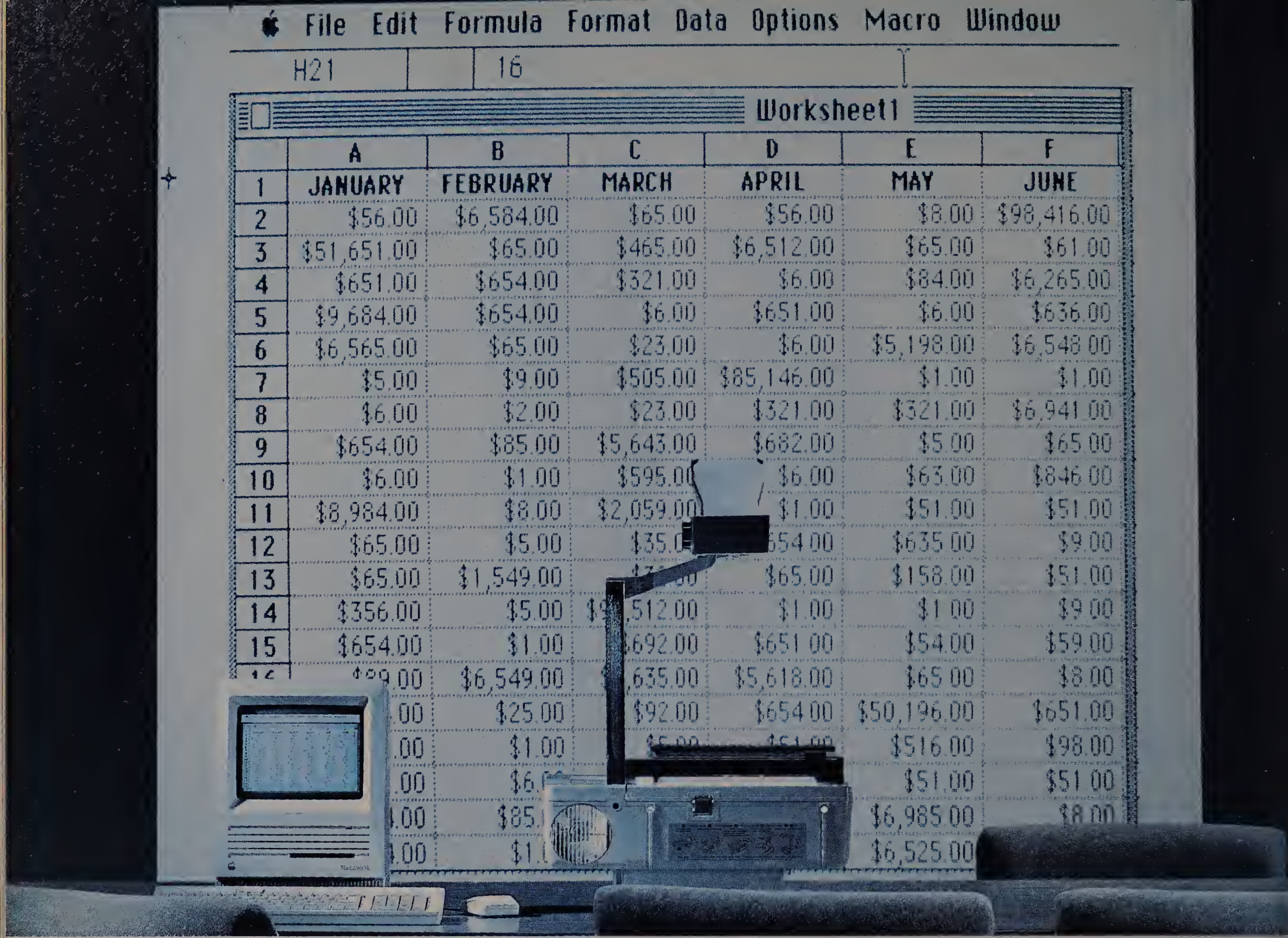
A Few Minor Problems

Arkanoid's eight-page manual lacks detail and information. It contains a comic-book story about the game's setting and two pages of quotes on "The Arkanoid Phenomenon." Only one page is devoted to instructions for playing the game on the Mac. However, if you pause the game and select About Arkanoid under the menu-bar Apple, you'll find a series of help screens that tell about scoring, key commands, strategies, and so on. The game is easy to figure out, and you could get along without a manual altogether—undocumented features are a fine old tradition in video games.

A more serious problem is the eye-strain factor. It's very hard to follow the ball against some of the complex backgrounds, and it's also difficult to distinguish among the various types of brick. Every Mac Arkanoid player I spoke with complained about the jazzy, distracting backgrounds. I played three color versions of Arkanoid—the Amiga version, the Nintendo version, and the original coin-op arcade game—and both the backgrounds and the bricks are easier to see in color. Discovery Software expects to release a color version for the Mac II in 1989.

But those flaws are minor; Arkanoid is a first-rate game. Considering how quickly you can become addicted to it, it's a good thing you don't really have to insert additional coins.—*Felicity O'Meara*

See *Where to Buy* for contact information.



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Perfectstudy 2.01

Study aid and test generator. ***Pros:*** *Improves study skills; relatively inexpensive.* ***Cons:*** *User interface is sometimes awkward; editing can be time-consuming.* ***Company:*** *Powerware Systems.* ***List price:*** *$39.* ***Requires:*** *512K.*

What Evelyn Wood does for dynamic reading, Powerware's study organizer may do for exam preparation. Perfectstudy is a learning aid designed to improve the memory retention and study skills of high school and college students. It claims to increase studying speed by a factor of three, guarantees 100 percent recall of all study materials entered into the system, and promises that grade point averages will improve for all those using the Perfectstudy technique.

Utilizing Perfectstudy's impressive test-generating feature, instructors can produce multiple-choice quizzes quickly by having the program automatically supply wrong answers for each question. It's even possible to create different versions of a single test from the same data file, since the application randomly selects the data used to generate exam questions.

While Perfectstudy will probably help students make better use of their study time (by helping them organize lecture notes and reading matter), and will probably improve a student's ability to answer questions quickly and accurately, you should be skeptical about Perfectstudy's claims for up to a 60 percent reduction in study time and error-free recall. The current version does not offer a procedure for measuring either increased study rate or reduced study time.

How Does It Work?

Perfectstudy improves memorization skills by teaching students to associate key phrases with definitions. Students create study files for individual textbook chapters and lectures. Each file entry consists of a key phrase (up to 50 characters) and a definition (up to 3 lines). As a precaution, the program automatically saves to disk after every fifth entry. Every Perfectstudy file must contain a minimum of 8 key phrases. The process of extracting key phrases and their definitions is a learning task in itself, forcing students to pay attention to the subject matter.

You create a new study file by incorporating the key phrases and definitions from two or more individual files for a cumulative study effect. With a linked file you can study several chapters or lectures. You can use Append File to add key phrases and definitions to an existing file, or use Revise File to make word changes or spelling corrections.

After you load a study file, the program is automatically in Phase 1. Perfectstudy presents a single underlined key phrase at the top of the screen (the question) and five randomly selected definitions below (the answers). If the correct answer is selected, a new key phrase appears with its possible answers. Students must answer each question correctly on the first try in order to move on to Phase 2.

Incorrect responses prompt the program to give the correct answer, include the wrong answer as a choice whenever the question is repeated, immediately ask the missed question again, and repeat the question four times at the end of the file.

Phase 2 reverses the study direction by offering a single definition as the question and five key phrases for answers. Phase 3 presents questions that alternate between Phase 1 and Phase 2 formats.

When used to create exams, Perfectstudy randomly selects the test format. Each quiz includes both key phrase and definition questions. The Print Test option generates a question for every key phrase in the file. To print a specified number of questions, you must rename and append the file, adding or deleting the required number of key phrases.

Printed tests have a coded number on every quiz and answer key; this comes in handy when there are multiple tests for the same class. Printed tests can include a space for the student's name and social security number, as well as the date.

ImageWriter LQ owners must copy the printer driver into the program's System folder and access Chooser under the Apple menu to select it. Otherwise the program will not print to an ImageWriter LQ.

Perfectstudy Is Not Perfect

One of the program's major weaknesses is that it only partially adheres to the Macintosh user interface. For example, say you click on Create and then decide to exit before writing the minimum eight key-phrase definitions. There is no cancel button option; you can exit only by restarting.

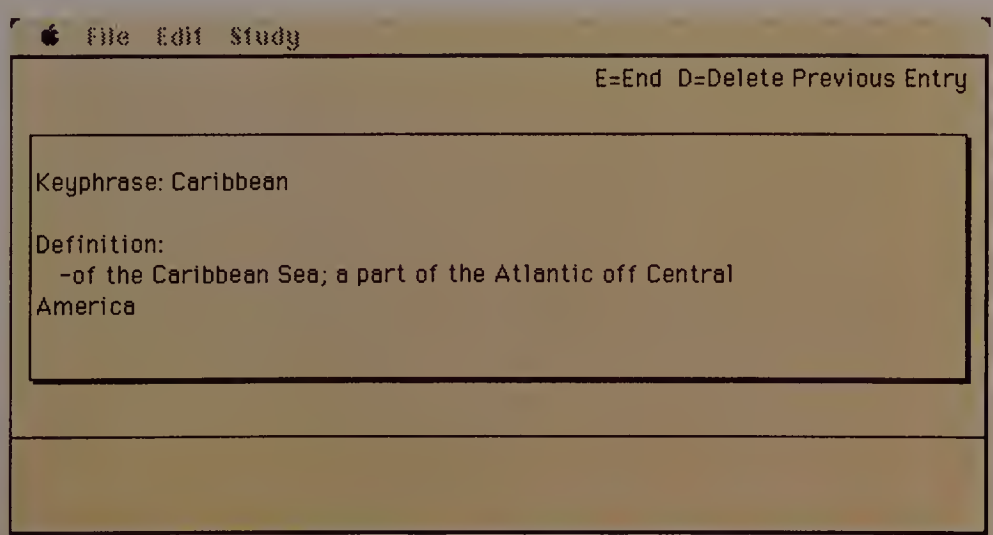
When you enter a key phrase, the cursor becomes a flashing vertical line. Unfortunately, even this line disappears when you write the definition, making it difficult to ascertain the cursor's actual position on the screen (see "Creating a Study File"). You can edit by pointing and clicking the mouse anywhere on the definition. You must press the Backspace (or delete) key (the arrow keys don't work) to erase everything up to the point of the error. Editing thus becomes a time-consuming process.

These annoyances are relatively minor—you can learn to cope with an occasional reboot or the absence of a flashing cursor. Version 2.0, however, had a serious bug that deleted files when the renaming function was canceled. Version 2.01 eliminates this problem. Contact Powerware for a free upgrade if you have the earlier version.

The Power to Do Your Best

Perfectstudy does not motivate students to study faster and retain more, but it does offer a study method for learning quickly and efficiently. Students can take advantage of the program's exercises to increase fact retention and can use the key phrase/definition technique to improve memory skills and test scores. All in all, Perfectstudy is a valuable learning aid, and its test-generating function is terrific.
—*Carol S. Holzberg*

See *Where to Buy* for contact information.



Creating a Study File
The absence of a visible cursor at the end of the definition means that you don't know where the cursor is until you begin typing. Because the arrow pointer does not become an I-beam, you can't position the cursor over text to edit.

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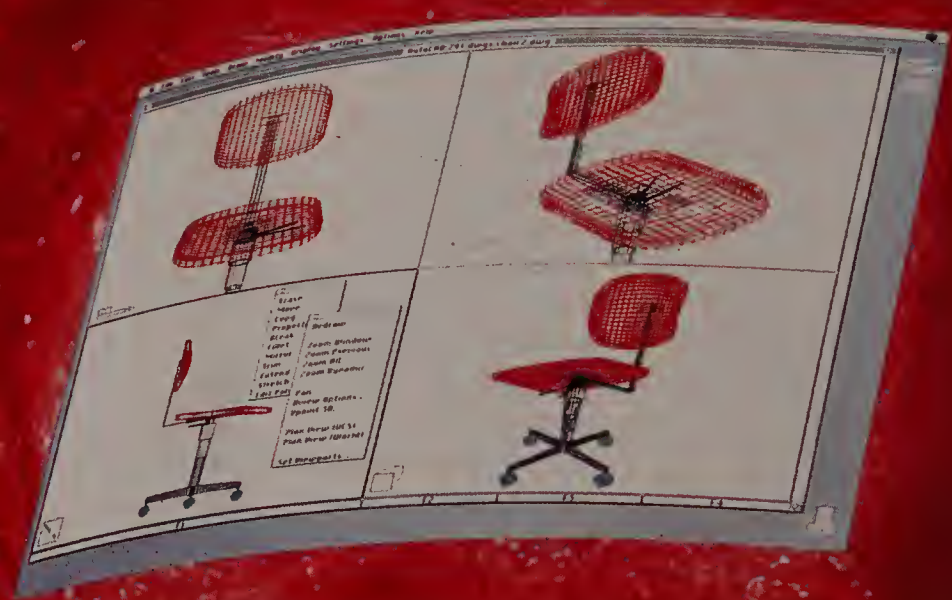

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AutoCAD on the Macintosh also supports the features that have made Apple the acknowledged leader in user interface design, offering pull-down, tear-off, and pop-up menus, complete support for Multifinder™ and the Mac windowing system, along with file dialog boxes to make access to your drawing files quick and easy. Clipboard support allows the transfer of AutoCAD drawings to a wide variety of Macintosh applications software.

A Better Perspective. AutoCAD is an advanced three-dimensional modeler that helps you solve design challenges on your Mac the way you would with physical prototypes. AutoCAD makes 3-D easy with user-defined construction planes, dynamic viewing and multiple viewports.

You can also model complex surfaces with AutoCAD using sophisticated tools such as tabulated cylinders, surfaces of revolution, ruled surfaces and Coons patches so you can represent surfaces accurately.

For even greater utility, AutoCAD provides entity handles that allow external applications to associate alphanumeric information, such as part numbers and capacity ratings, with graphical elements in the drawing. This associativity is creating an entirely new generation of useful third-party applications software.

A Reflection of You. AutoCAD is an open-architecture system including AutoLISP,® an embedded programming language that lets you program AutoCAD to reflect your way of doing things. Add your own menus to enter your own commands, write macros, develop custom symbols and drawing functions, or program standard procedures for document production and management.

Hundreds of third-party programmers have used AutoLISP to develop entire systems that make AutoCAD perfect for applications ranging from chemical engineering to technical publishing. Many of these programs run on the Mac II and more are on their way.

Maintain Your Standards. AutoCAD is the most extensively used, most broadly supported, widely taught design software in the world. AutoCAD is backed by over 1,400 highly-trained dealers and 150 Authorized Training Centers in 60 countries. We'll make sure you get what you expect from your CAD investment. That's what standards are all about.

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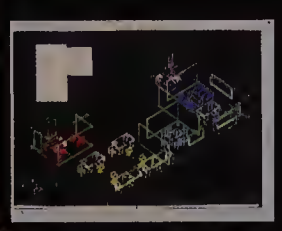

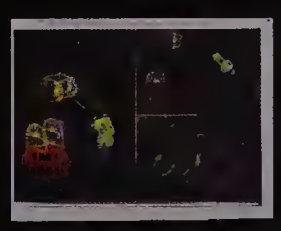

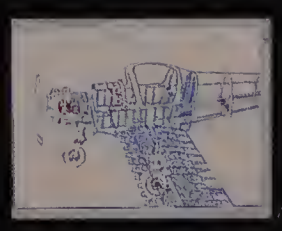

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Voyager 1.0

Desktop planetarium. ***Pros:*** *Fast; shows many celestial objects; choice of sky projections; shows sky from any planet.* ***Cons:*** *Accuracy insufficient for some purposes.* ***Company:*** *Carina Software.* ***List price:*** *$99.50.* ***Requires:*** *1MB.*

Voyager is a desktop planetarium that shows the sky as seen from any point on earth or from any planet. It also lets you see the sky's appearance at any time within a few centuries of the present. By speeding things up, so that years flit by in seconds, you can even watch the planets do their celestial dances.

Choose a View

Voyager's default display is called Star Atlas. You select which rectangular chunk of the sky you wish to see and in what magnification. A second view, Celestial Sphere, shows one hemisphere of the sky, much as a planetarium does. Local View is the third option. With it you see the sky as it appears from your own backyard—complete with horizon—which is useful if you're preparing for an observation, since the tiny white stars are simulated with exceptional realism. (Voyager screens have been reversed.)

Next you choose whether to see the planets, the constellation names and outlines, double stars, deep space objects such as galaxies and nebulas, celestial coordinate grids, or the sun's path along the zodiac. (Voyager, incidentally, is one of very few programs to correctly include Ophiuchus as the 13th constellation of the astronomical zodiac.) You can also select up to 9100 stars for viewing. And, of course, you set your location and the date and time.

You can change the orientation of the sky by scrolling and enter the appropriate time and, voilà, the sky redraws itself in seconds. The speed is astounding and encourages casual exploration.

Click on any object, and instantly you're given information about it: its name; brightness; celestial coordinates; rising and setting times; and in the case of the moon, sun, or a planet, its distance from both the earth and the sun. Or type in the name of an object, select Find and Center, and seconds later that object appears in the middle of your field of view.

Have You Been to Pluto?

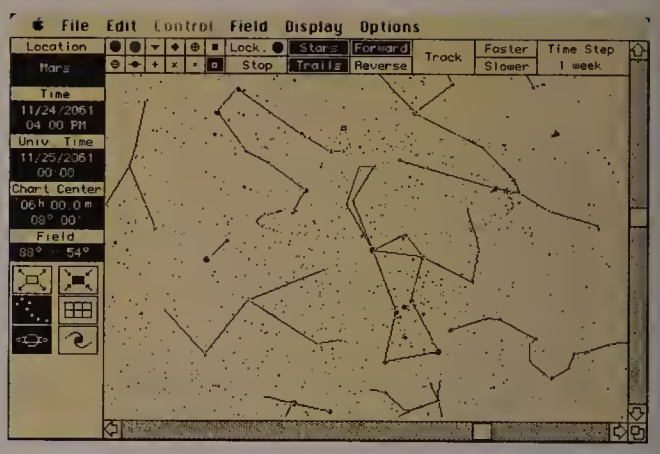
Voyager breaks our earthly bounds and lets us view the sky as it appears from any place within about 10 billion miles of the sun. A few mouse clicks and you're on Venus or the moon. For years I've watched Mars in our sky, but now I can watch the earth from Mars. (In March the earth is in Scorpius as seen from Mars.) From remote Pluto, the inner planets seem to huddle around the sun. I watched the February 20th lunar eclipse from the moon, where the earth blocks light from the sun in a partial solar eclipse. You can also look down on the solar system as seen from above and rediscover the laws of planetary motion.

The real sky is in continuous motion, but the motion is usually too slow to notice. The speed at which objects in Voyager's sky move when zipping through the centuries draws gasps even from people who have seen a lot of astronomy software. Go to Mars, set the date for New Year's Day in 2060, select an interval of one week, and watch Halley's Comet loop through Orion and Taurus. Switch to Venus and watch the earth sail through the constellations. Sit billions of miles from the sun and watch the planets in their orbits.

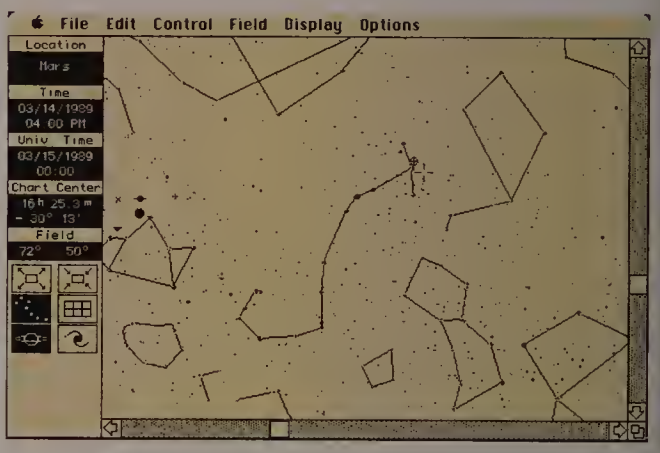
I'm most impressed by the ease with which Voyager moves through space and time, and the speed at which the program draws displays. The program's accuracy is more than adequate for most purposes, but you may need greater precision for critical applications (like viewing a close conjunction of a planet and star) or for dates more than a few centuries from the present. Nevertheless, this teaching tool should find a home in many astronomy courses.

Voyager calls itself a desktop planetarium, but that's an understatement. I work with a large planetarium, and it can't do a fraction of what Voyager does. Voyager lets you look at the sky and the solar system in ways you probably never even dreamed of before. —*John Mosley*

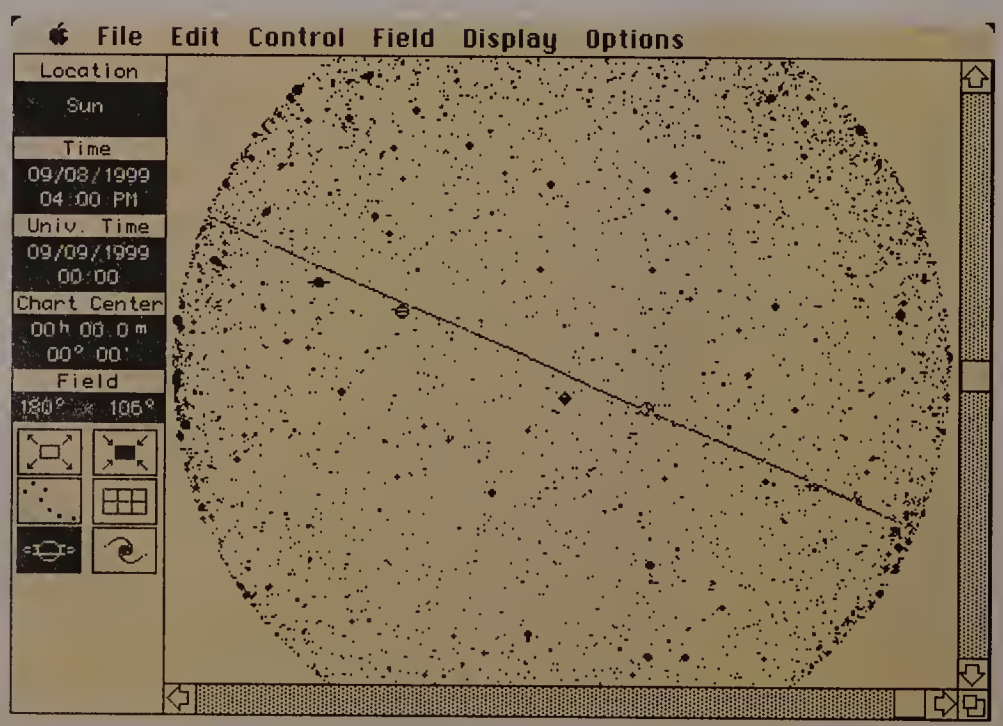
See *Where to Buy* for contact information.



Halley's Comet, from Mars, 2060 A.D.
The next time Halley's Comet appears, people on Mars will watch it too. Here is its path from New Year's Day 2060 to Thanksgiving, 2061, at one-week intervals, through the constellations Orion and Taurus. The comet is the little square near the top. The constellation outlines are turned on.



You Are Here
The earth (top center) is entering Scorpius as seen from Mars on the 15th of March. The optional constellation outlines are turned on. Celestial grids and deep-space objects are turned off.



Doom in 1999?
Cosmic catastrophists predict that an extraordinary planetary alignment in 1999 will herald the Second Coming and the end of the earth. Maybe, maybe not, but with Voyager you can see for yourself where the planets will be. This is the view from the sun on September 9, 1999, the planets are strung out along the ecliptic, the plane of the solar system.

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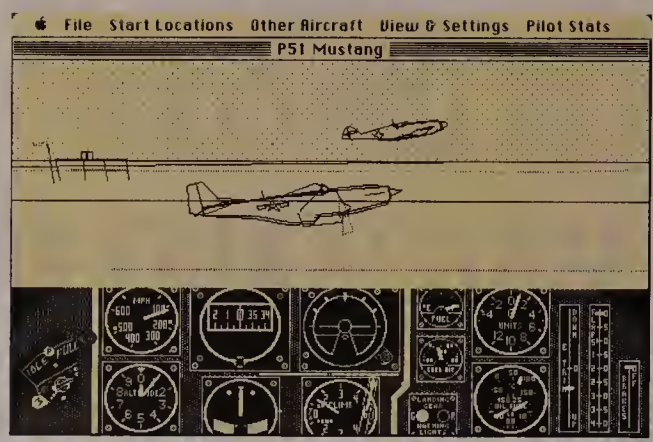
P51 Mustang Flight Simulator

Three-dimensional flight simulator. ***Pros:*** *Attention to detail; superb Replay feature; fluid game structure.* ***Cons:*** *Only works on a Plus or an SE; takes practice to fly smoothly.* ***List price:*** *$59.95.* ***Company:*** *Bullseye Software.* ***Requires:*** *1MB; runs only on Macintosh Plus or SE.*



Formation Flying
The only time you ever see what your plane looks like is during a Replay, when you can view your flight from outside the plane.

If there's a better way to relax than soaring high above the fields of France in a nimble World War II airplane, I don't know what it is; there's nothing like strafing the Eiffel Tower to release tension. The plane, the fields, and the tower can be yours in electronic form at least—in P51 Mustang Flight Simulator. This new program, by the author of the Ferrari Grand Prix and Fokker Triplane simulations, is difficult to classify; it's neither a shoot-'em-up arcade game like Apache Strike, nor a realistic-to-the-point-of-boredom simulation like the Microsoft Flight Simulator. Instead, P51 Mustang combines aspects of both, recreating the romance and glory associated with the Mustang fighter plane.

Climb Aboard

In P51 Mustang, there is no object of the game. You don't win, lose, or beat the clock. Sure, you can triumph by shooting down a German plane, and you can perish ignobly by plowing into the ground. But the emphasis is on the pure thrill of flying.

For that reason, there is no one situation, and no main flying mode. Instead, the program's menus offer a choice of locations and enemy plane characteristics, allowing you to determine your own adventures. For example, you could start in midflight over Paris, and opt either to simply admire the "scenery" or to engage an enemy plane in a dogfight high above the Arch of Triumph. Or you could take off from any one of six European air bases and search for trains, trucks, or air bases to strafe—with or without a German plane on your tail. Or, if you're less bloodthirsty, you may prefer to test your skill by flying around an air racecourse.

At any point in your aerial exploits you can halt the action and use the Replay feature. With this option, you can review your flight so far, in forward or reverse, at any speed, and from any camera angle, inside or outside of your plane. Not only is this a tremendous teaching aid, allowing you to spot your own flying errors, but it's also a good opportunity to gloat over your victories after shooting down an enemy plane, since you can replay your triumph over and over, in slow motion, from every delicious angle.

The Replay feature allows you a luxury that real life seldom does: the chance to relive a bungled situation with the knowledge of hindsight. If, in a certain dogfight, you were shot down because you banked left instead of right, all is not lost; you can Replay that flight up to the fatal moment, then turn the Replay off and continue the dogfight.

Enjoy the View

But how well does this simulation recreate the feeling of flying? As with most 3-D simulations for the Mac, details in the screen environment are sparse. You won't find clouds in the sky or trees on the ground, because the Mac has so much screen redrawing to do in order to create a convincing illusion of motion. Instead, you gauge your position by watching the occasional dotted lines that stretch along the ground to the horizon, and you try to keep an eye on the various meters on the cockpit's control panel. In general, the program creates the feeling of movement well; you may get positively queasy when flying the Mustang upside down or in loop-the-loops, and your ability to look out the windows in any direction adds to the realism.

What makes P51 Mustang charming, though, is its graphic style. The planes, trucks, and explosions are drawn in the crude, devoted manner of a war-fascinated teenager doodling in the margins of an algebra notebook; when you shoot down a plane, you can almost hear the "Oh, cool!" as it bursts apart into shards of flying metal. If you are ungallant enough to blow up an airplane that's still on the ground, a tiny humiliated 3-D pilot stands on the runway next to the smoking wreck. And, when things aren't going well—for example, if you're not careful about the g-forces to which you're submitting your plane, and the wings fall off as a result—you can actually bail out, whereupon a parachute opens and you drift gently to the ground.

If it weren't for the obvious passion of the program's author for his subject, in fact, there would be much less to recommend. The program runs only on the Mac Plus and the SE, and even has problems running on an accelerated SE. Furthermore, flying the plane isn't easy; when you're a beginner, you'll notice a certain tendency for the plane to plummet crazily into the ground. Even once you're airborne, you might actually have trouble finding anything to do; enemy planes sometimes take their sweet time to attack you.

But once you've had some practice, you may become quite attached to P51 Mustang. The digitized sounds are terrific—there's the splash when you bail out over the English Channel; the squeak of tires when you land; the purr of the Rolls Royce engines, whose pitch changes as you adjust the throttle. And then there's the interactive aspect of the program—with the proper cable, you can hook two Macs together and have dogfights with a fellow aerophile. (You can't play via modem, however.)

Back to Earth

The P51 Mustang Flight Simulator isn't a landmark program for the Mac. It's not necessarily even the best flight simulator. But never was there a better candidate for the entertainment software category. Created by a programmer who takes obvious pride in his obsession with the P51 Mustang, it's a loving tribute to the bravado and agility of one of World War II's key players, and an opportunity to feel the thrills of wartime flight without risking so much as a fingernail.

And who knows? When you get back to your serious work, you might just see the ghost of a tiny set of crosshairs superimposed on the cells of your spreadsheet.
—David Pogue

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Window Shopping

Programs that teach speed-reading, vocabulary, or help you with your taxes, plus paper for super output

by Lawrence Stevens

John F. Kennedy was said to be able to digest ten newspapers plus dozens of reports and hundreds of memos each day. Those of us who went to school during his presidency remember how speed-reading courses proliferated as parents tried to help their children "read like the president." Almost all of us who took these courses were able to increase our reading speed dramatically. But we also discovered that speed-reading was actually "speed scanning," a method of fishing the main idea out of a passage without reading each word. And while this eliminates all the pleasure of reading and tends to be exhausting after a while, it can be useful.

Speed Reader II 1.1

If you want to learn to speed-read, Speed Reader II can help with its six modules. Two of them, Warm-up Letters and Warm-up Words, flash letters and words on screen for increasingly shorter periods of time in order to help you recognize them more quickly.

The program's four remaining modules have you read passages at increasing speeds. For example, the Column Reading module scrolls a narrow, newspaper-like column on the screen, but only one line is visible at a time (the rest of the column is grayed out). Your job here is to read each line before it disappears. And the Paced Reading module displays one paragraph at a time; your job here is to finish reading the paragraph before it's replaced by another one.

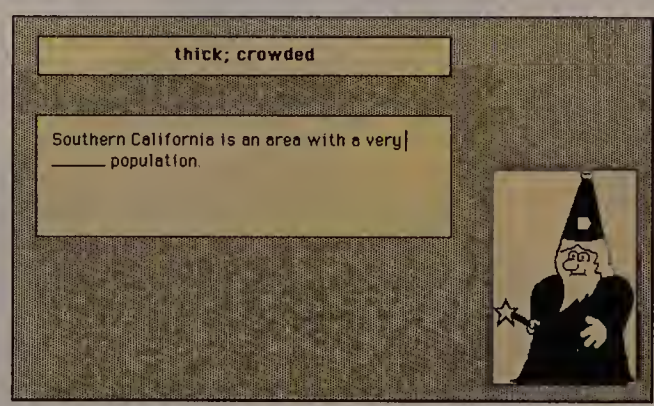
The program's 35 reading passages are interesting and teach you such speed-reading techniques as how to move your eyes across the page and how to eliminate inner speech while you read. After you complete each passage, multiple-choice questions test your comprehension. Some of these, however, are too easy and can be correctly answered by guessing, and they often include one or two obviously wrong choices. And because there are only 35 reading passages in the four modules, you soon start repeating passages. Even on your second time through, you'll have a hard time determining if you are really reading faster or just remembering.

Despite these problems the program can help you increase your reading speed since doing so is not hard once you learn a few basic techniques. If you don't want to spend the time and money to take a speed-reading course, this is the next best thing.

Word Attack 1.0

For educational software to be valuable, it should do more than simply replicate a workbook. Word Attack, a vocabulary builder for grades 7 through 12, partially meets this criterion by providing a point-and-click interface and a video game, but it doesn't go far enough in making use of the Mac's capabilities.

You choose a lesson by selecting a difficulty level and indicating whether you want to work with adjectives, nouns, or verbs. The vocabulary is difficult. Level 1, which is supposed to be for fourth graders, includes *dour, ominous, peer,* and *yearn.* While not necessarily familiar to children at a certain grade level, as the manual points out, these are all words they are capable of learning. Each lesson is made up of 25 words, so the entire program of nine levels times three parts of speech teaches 675 words. You can also create your own word lists.



Word Attack
The Word Usage module requires recall, correct usage, and accurate spelling. You must complete the sentence by typing in the correct word. If you make an error, the entire list of words in the file will appear at the right so that you can see the spelling and correct your error.

The first module in each lesson, Pre-test, is a multiple-choice quiz that determines the words the student already knows. Testing children on words they have not yet learned can have a discouraging effect, and that should be weighed against the advantage of being able to assess the student's level in order to plan lessons. But, incomprehensibly, Word Attack does not eliminate the words answered correctly in Pre-test from any of the lesson's succeeding modules. In fact, except for one trivial instance, the results of Pre-test are totally ignored.

The second module, Word Display, teaches the meaning of the words the student worked with in Pre-test. The list of 25 words appears on screen. When the student selects a word by clicking on it, its definition and an example sentence are displayed, and the word is pronounced by the Mac's synthesized voice. This is a valiant attempt but one that fails because of an imperfect medium. The Mac's voice is just not good enough to teach proper pronunciation. Parents or teachers who use this program will do better to turn off the voice and help the student with pronunciation themselves.

The next three modules—Multiple Choice, Word Match, and Word Usage—all provide different types of drills for the same 25 words. Each of these modules

(continues)

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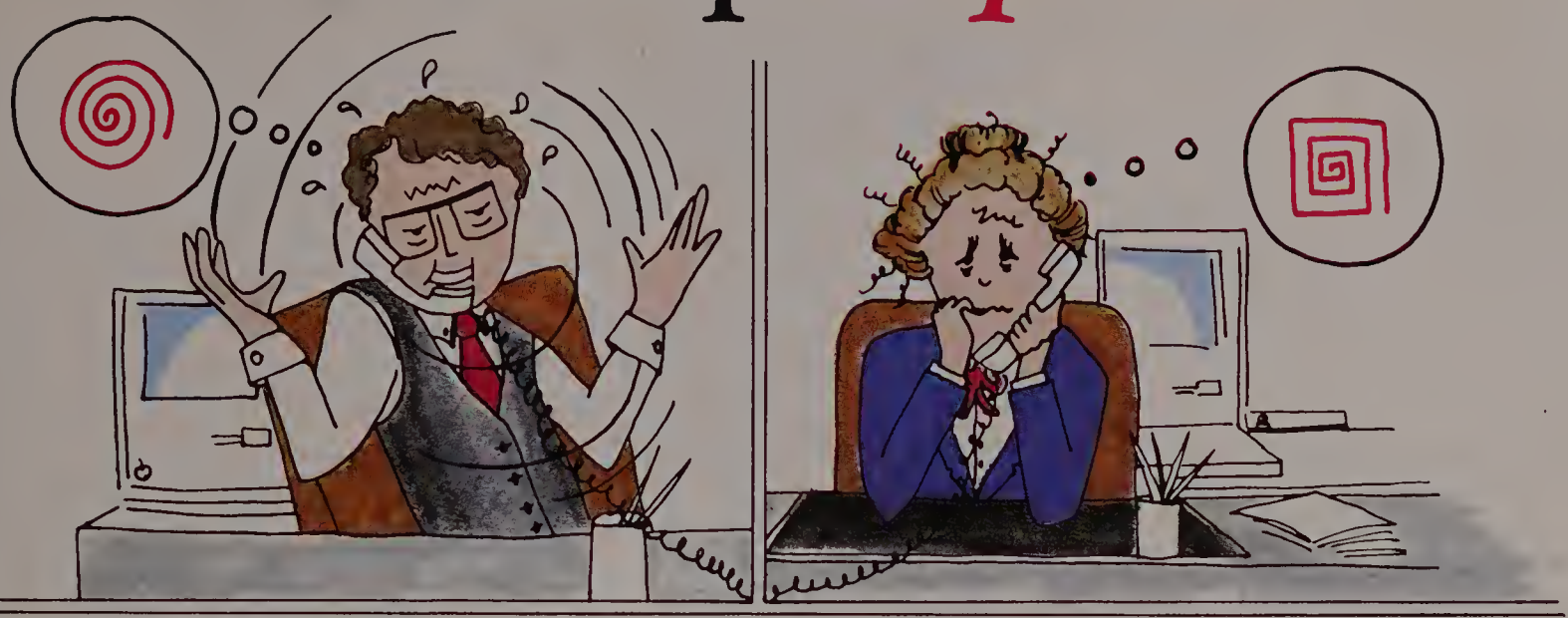

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keeps track of correct and incorrect answers, and lets the student repeat the drill until all the words are defined correctly. But there is no carry-over; no matter how well the student does in one module, he or she must start again with the same 25 words in the next module.

The Word Attack video game is visually and audibly interesting but unimaginative in concept. It's basically a multiple-choice test, but instead of clicking on the correct answer, the student zaps it with a wizard's wand.

There is little doubt that a student who uses Word Attack regularly will increase his or her vocabulary. But the program would be much more effective if it incorporated more complete diagnostic tests with which to create customized lessons.

Tax Forms in Tax Stacks
Most of the forms in Tax Stacks are linked so that data from the total line of one form is carried over to the appropriate lines on other forms.

Custom Menu Tutorial

It's difficult to understand how a company like Microsoft, which has created some of the best personal-computer software, can't seem to write manuals that clearly explain how to use that software. In the Macintosh world, this is especially true of those Excel utilities that require programming, like the functions and macros, and now with version 1.5, its custom dialog box and custom menus. Heizer Software, which has distributed over 30 tutorials for Excel, has come up with 2 more to teach these new 1.5 utilities.

Let me begin with a warning: these programs are for the experienced Excel user who is comfortable with programming command macros. Even advanced users will have to spend considerable time on these tutorials. A custom menu is actually a macro, and a custom dialog box is a table within a macro. Dialog boxes especially take some work to plan and create.

Each tutorial, which works along with your copy of Excel 1.5, provides a macro sheet that gives examples of the dialog box, and menu commands and a work sheet to show the results. The examples start with the basics and move on to the complex, so that when you're finished, you've seen almost the entire range of possibilities.

As with all Heizer tutorials, the teaching method is to demonstrate more than to explain. First a short description of the macro appears on the screen, then you run the macro, and finally you study how it works. The last tutorial requires spending time both looking at the macro commands and reading the Microsoft manual to understand what each command does. It's a method of learning that requires a lot of effort on the part of the student.

Tax Stacks

Tax Stacks is a set of HyperCard stacks for completing and printing 1988 federal income tax forms. One of the nicest features is that the program uses two or three questions on each card to walk you through the forms. This questionnaire approach makes filling out the forms less complex because it allows you to focus on small slices of data at a time. There are other advantages as well. Each card has a scrollable field, accessed through a button, with IRS instructions about the two or three listed questions. Each card has a notes field as well, also available through a button, on which you can type reminders. You can raise a flag on any card to signify that you have not completed all the questions on it. Before printing a form, the program returns you to cards with raised flags. You can also flip through all the cards with raised flags.

Each card has a calculator button that takes you to a calculator card for figuring, and then cutting and pasting entries. The only advantage this calculator has over the Mac DA calculator is that it has a scrollable tape, so you can check your entries for accuracy. It is also about ten times slower to access and remove than the DA version, so I ended up using the DA most of the time.

After you finish the questionnaire, the program sends the data to the appropriate IRS forms, which appear on screen (half a page at a time). If you want to make changes to any of the entries on the form, you click on the appropriate field, and the program returns you to the card where you entered that data.

The forms are linked together so that the total line will be transferred to the appropriate space on other forms. However, check to make sure the carry-overs actually occur. The program also includes most worksheets, including IRA, Earned Income Credit, and Social Security Benefits—the results of which are not carried over automatically.

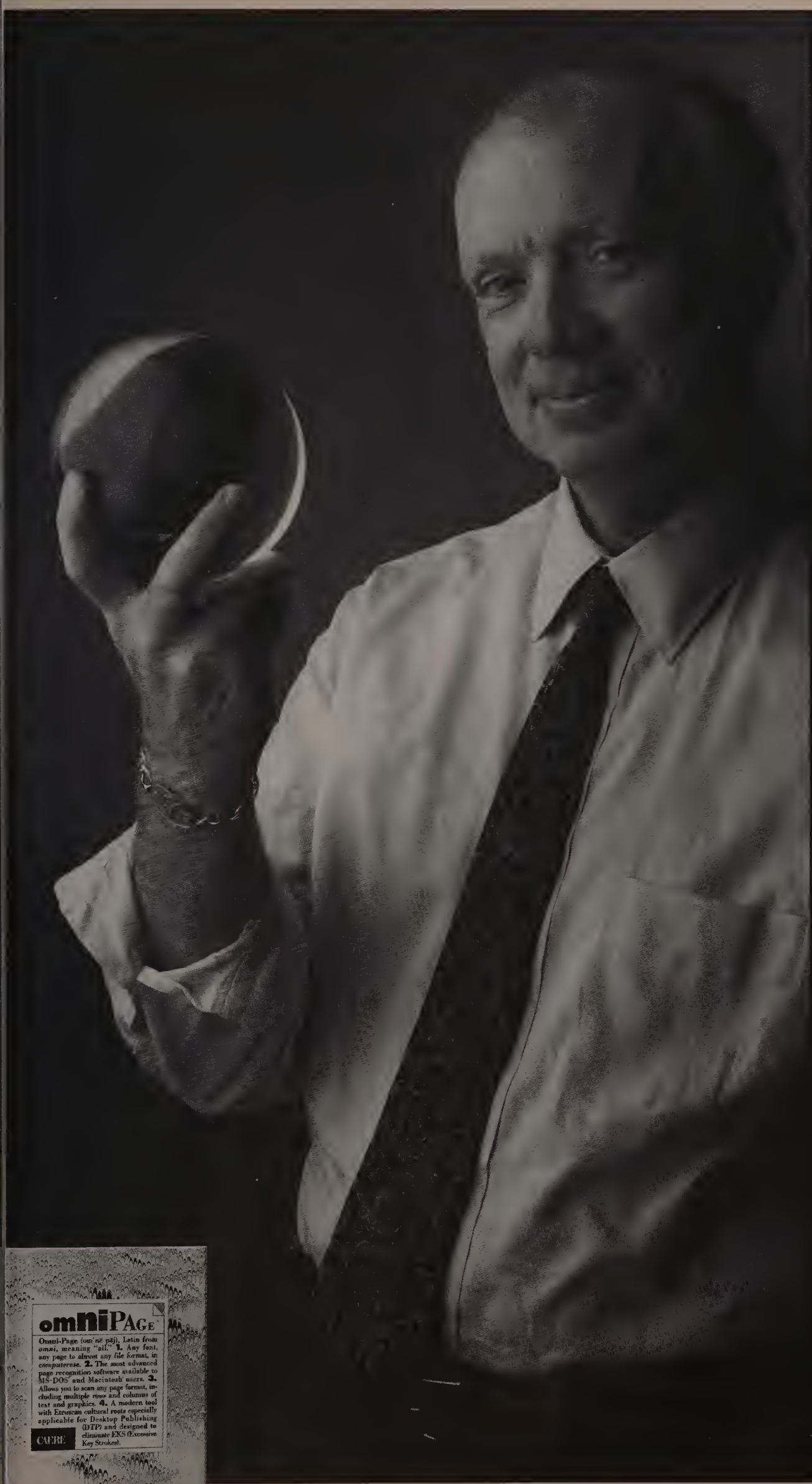
In general, this program is self-operating and easy to use. However, a good working knowledge of HyperCard will be helpful if you get into trouble or want to use a shortcut.

My main complaint is that the program tries to be too cute. I don't think that substituting a poorhouse for the Home button, or having a main card with an animated dollar bill flying away, is particularly funny. Nor do I like the fact that I'm subjected to a 15-second rendition of "Yankee Doodle" every time I open this stack. And I could do without the tax jokes that you can get to on each card by clicking on the Jack-in-the-Box button. This is a good program in its own right; it doesn't need the corn.

Pro-Tech Computer Paper and Film

James River Graphics sent me a sampling of its unique Pro-Tech line of paper. There is a different type of paper for laser, ink-jet, thermal-transfer, pen-plotter, and impact printers. Compared to the standard copy paper that I normally use on my LaserWriter, the Pro-Tech paper does provide much better contrast. □

See *Where to Buy* for contact information.



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Customer Profile

Regis McKenna

Age: Old enough to remember the day that Intel Corporation was founded.

Profession: Chairman of Regis McKenna Inc., a major marketing company based in "Silicon Valley." A general partner in the venture capital firm of Kleiner Perkins Caufield & Beyers. Author of the *Regis Touch* and most recently, *Who's Afraid of Big Blue?**

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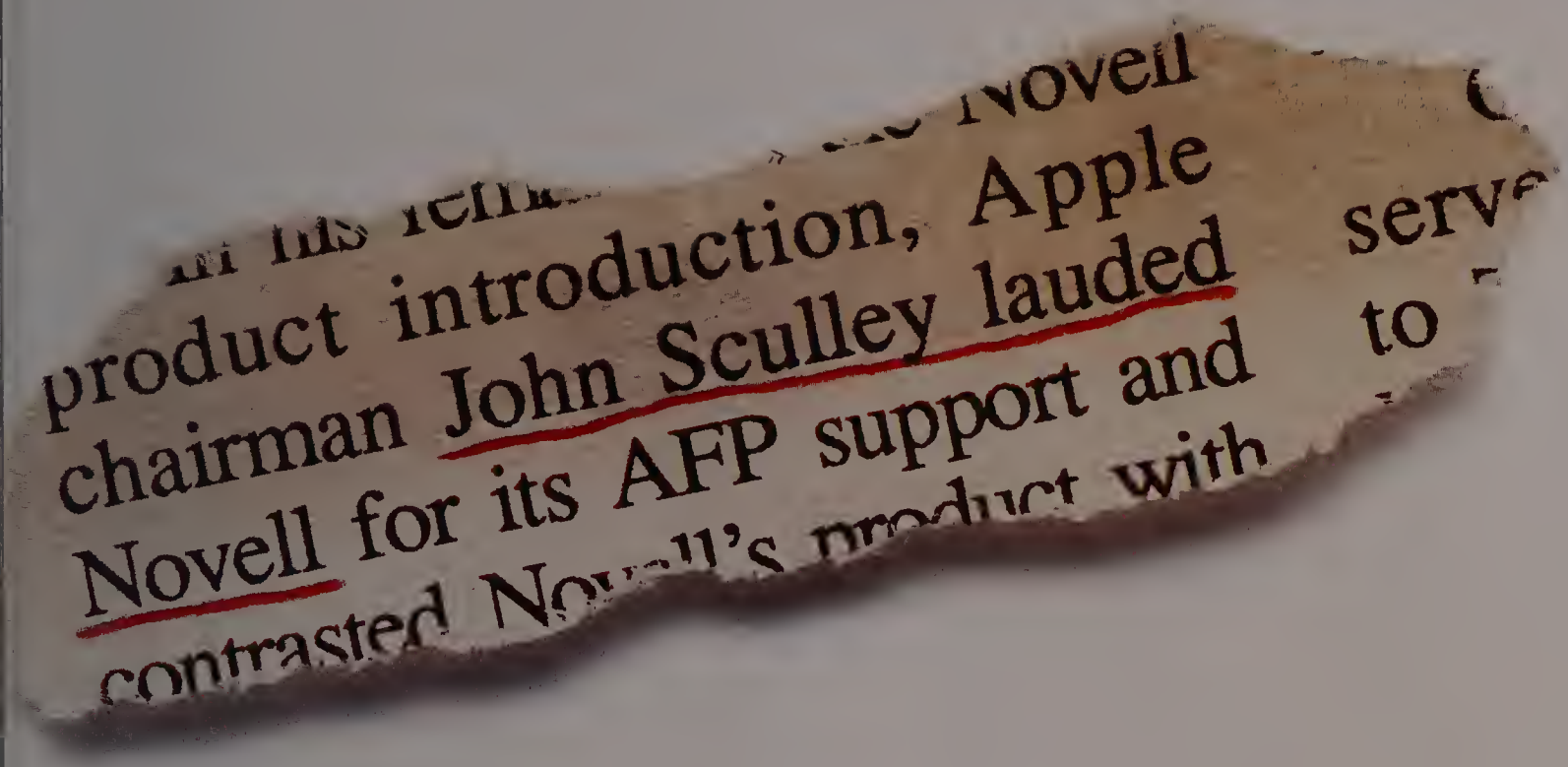

InfoWorld, June 20, 1988

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New Products

Information on the Mac's latest hardware, software, and accessories

Edited by Mary Margaret Lewis

This section covers Macintosh products formally announced but not yet evaluated by *Macworld*. All prices are suggested retail. Please call vendors for information on availability.

HARDWARE

ADEX Chromatron Color graphics monitor with multiple scan rates from 31kHz to 67kHz with automatic color tracking. $3595. Telegen, 415/326-6103.

HDD32 Hard Drive Portable 32MB SCSI external hard drive. Compatible with Mac 512KE, Plus, SE, II, and IIx. Has an external SCSI address switch and automatic head parking. $499. Ehman Engineering, 307/789-3830.

HDD32 Hard Drive

Hurdler Centronics Parallel Interface Board Mac II NuBus add-in board that connects a Mac II to any device that uses a Centronics-compatible interface. $199. Creative Solutions, 301/984-0262.

LightningScan Hand-held scanner that transfers images up to 4 inches wide to a Mac Plus, SE, or II. Includes editing

LightningScan

tools and supports TIFF, EPS, PICT, and paint formats. $549. Thunderware, 415/254-6581.

Local PhoneTalk Device that connects Mac or printer to an AppleTalk network using standard telephone wires or any unshielded two-conductor cable in place of AppleTalk cables. $49.95. AESP, 305/653-0898.

MagicNet Network connector node with cable and terminator. Effective at distances up to 3000 feet using standard telephone wire and RJ11 connectors for node connection. $24.95. MacProducts, 512/343-9441.

MaraThon SP Plug-in Mac II interface that adds I/O ports. Adds an RS-232C standard serial port accessed through an IBM-style DB9 connector, and a Centronics parallel port accessed through a DB25 connector. $299. Dove Computer, 800/622-7627.

MixNet MixNet 8884 mixes a business phone system and a computer network over a single cable. MixNet 438 mixes LocalTalk cables with modular phone jacks and is compatible with all LocalTalk cabling systems. MixNet 448 connects printers through AppleTalk to small networks. MixNet 8884 $69; MixNet 438 $39; MixNet 448 $35. Thor Manufacturing, 800/346-4694.

QT-Mac150 Data-cartridge tape-backup system compatible with Mac II, IBM PC, and IBM PS/2. $2795. Tecmar, 216/349-0600.

Scion Image Capture Board Image capture board for the Mac II that crops, centers automatically, and performs real-time capture and display at a rate of 30 frames per second. $1195. Scion, 301/845-4045.

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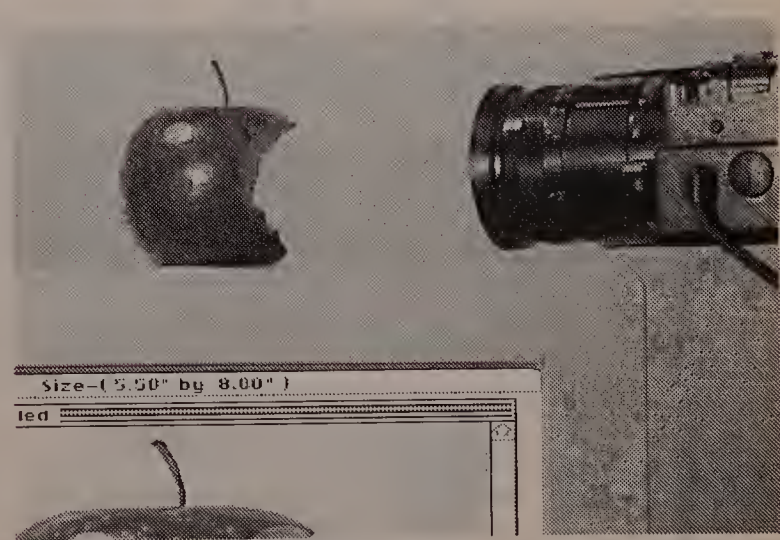
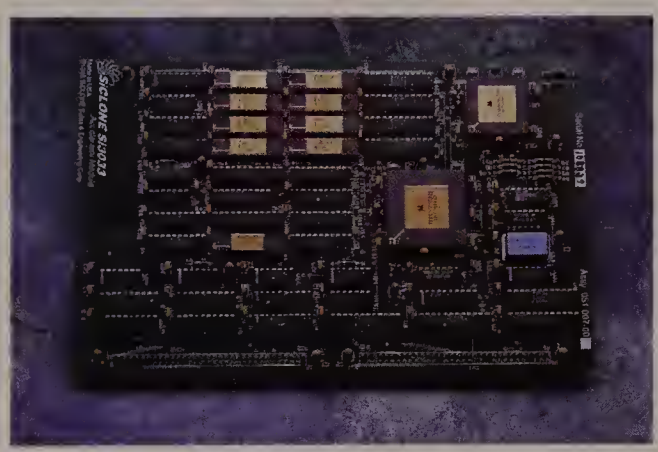


Scion Image Capture Board

Si3033 Accelerator Mac II accelerator that operates at a clock rate of 33.3MHz. Compatible with all Mac II software including A/UX. $3999. Siclone Sales & Engineering, 408/734-9151.



Si3033 Accelerator

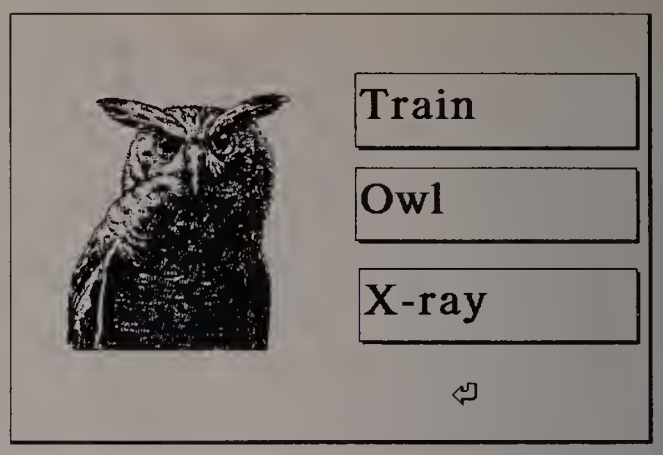
Smart Kid Connectivity application that works both as a stand-alone and on the AppleTalk network. Does one-to-one translation of all format codes to enable bidirectional sharing of word processed documents between the Mac and a variety of dedicated word processing systems. $7500. Interpreter, 303/431-8991.

SoftStep Memory Modules SoftStep I (256K) and SoftStep II (¾MB) are memory modules that come with sockets. SoftStep III for the Mac II has no memory and allows four 256K SIMMS to be placed in one slot in the Mac II. SoftStep IV for the Mac Plus allows you to install four 256K SIMMS. SoftStep I $549; SoftStep II $1395; SoftStep III and IV $195 each. Computer Care, 612/920-2273.

Tele-Scrambler I Plug-in security unit that scrambles signals for both voice and data transmission. Works with any computer modem. Warning light indicates attempts at wiretapping or eavesdropping on the line. $995. Metme Corporation, 312/215-2470.

SOFTWARE

Alphabet Pictures Animated graphics program for preschoolers with word- and picture-matching game. Digitized child's voice pronounces and spells words. 1MB min. memory; requires HyperCard version 1.2.1 or higher. $25 plus $2 s/h. Clay Nixon, 502/896-6581.



Alphabet Pictures

Aussie Joker Poker Mac poker game for up to 90 players. 512K min. memory. $49.95. Joker Software, 619/387-8623.

Autoduel Car-to-car battle game that lets you customize your own futuristic car with such accoutrements as flame throwers and heavy armor. Battles take

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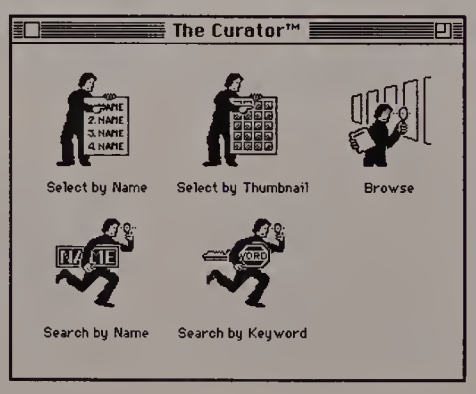

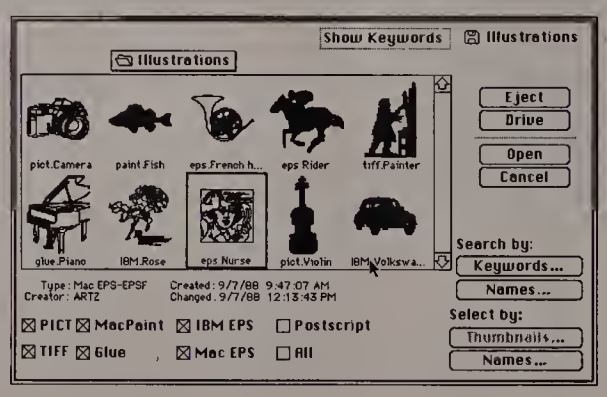

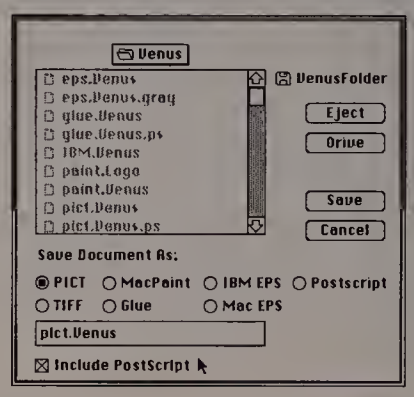

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MacWorld
June '88

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MacWEEK, Jan. '88

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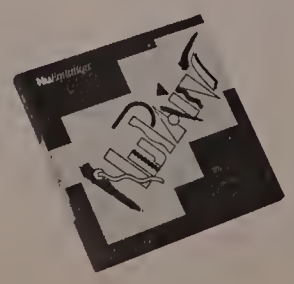

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place on freeways and in arenas. 512K min. memory; requires double-sided disk drive. $39.95. Brøderbund, 415/492-3500 or 800/521-6263.

Autoduel

Defense Acronyms Database of more than 6500 Defense Department, military, and electronics acronyms in Microsoft Excel and Works formats. 1MB min. memory; requires Microsoft Excel or Microsoft Works. $20. Heizer Software, 415/943-7667 or 800/888-7667.

The Elementary Signer General instructional software for the hearing-impaired child who is not familiar with sign language. Includes over 160 signed words. 128K min. memory. Silent version $79.95; talking version $99.95. Microtech Consulting, 319/277-6648.

Executive Information Systems Explorer HyperCard application guides corporate managers in selecting business systems and related information technology. 1MB min. memory; requires HyperCard version 1.2 or higher. $195. Softouch Software, 503/241-1841.

Executive Query Tool Application that uses Network Innovations' CL/1 to access a variety of database types. Results can be pivoted from tabular to report format. Can be customized to suit user's needs. 1MB min. memory. Single copy $1000; volume discounts and trial runs available. Applications Design, 312/642-4144.

HyperEstimator Residential construction estimator that can be used with MacNail version 2.2. 1MB min. memory. $95. Turtle Creek Software, 607/589-6858.

Images with Impact: Business I Clip art collection with over 175 occupational and business images in encapsulated PostScript file format. Files can be imported into any EPS-compatible program and can be opened in Adobe Illustrator or Aldus FreeHand. 1MB min. memory (2MB recommended). $129.95. 3G Graphics, 800/456-0234.

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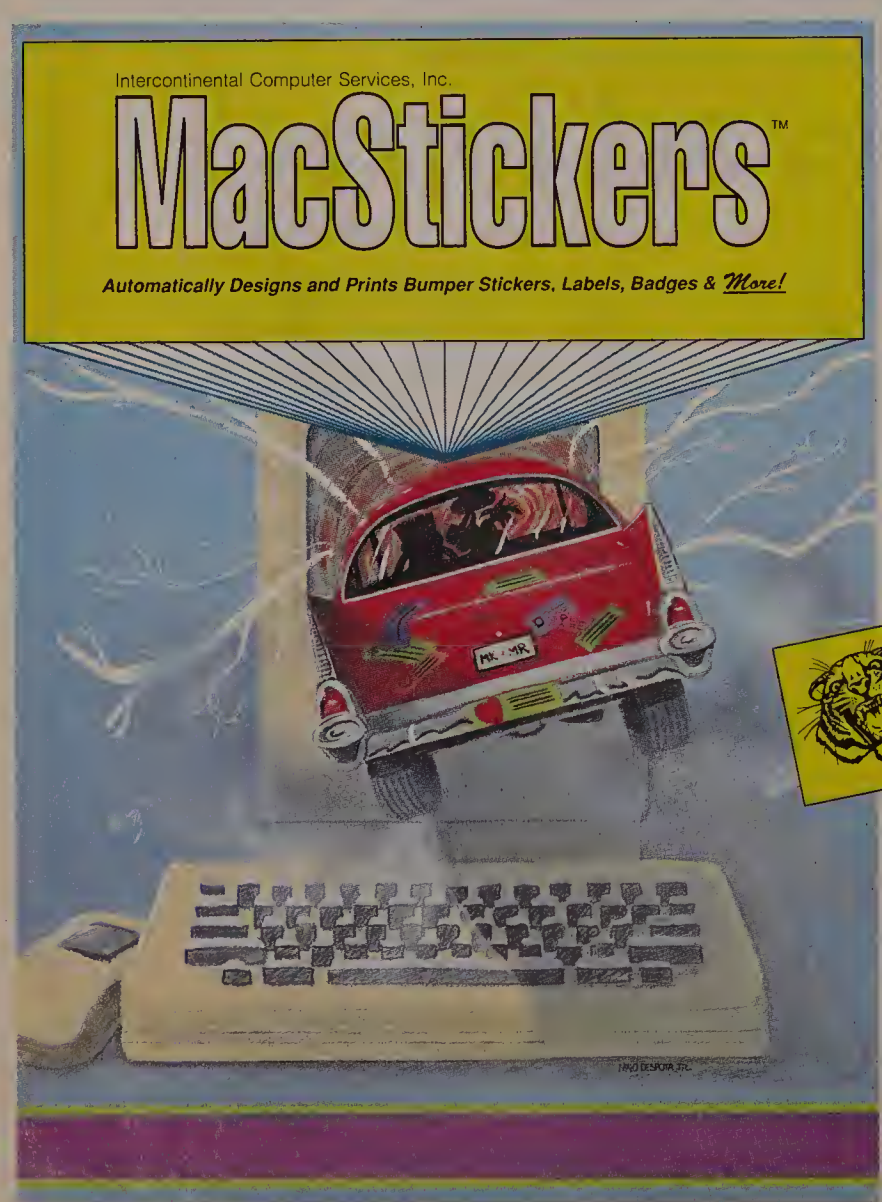

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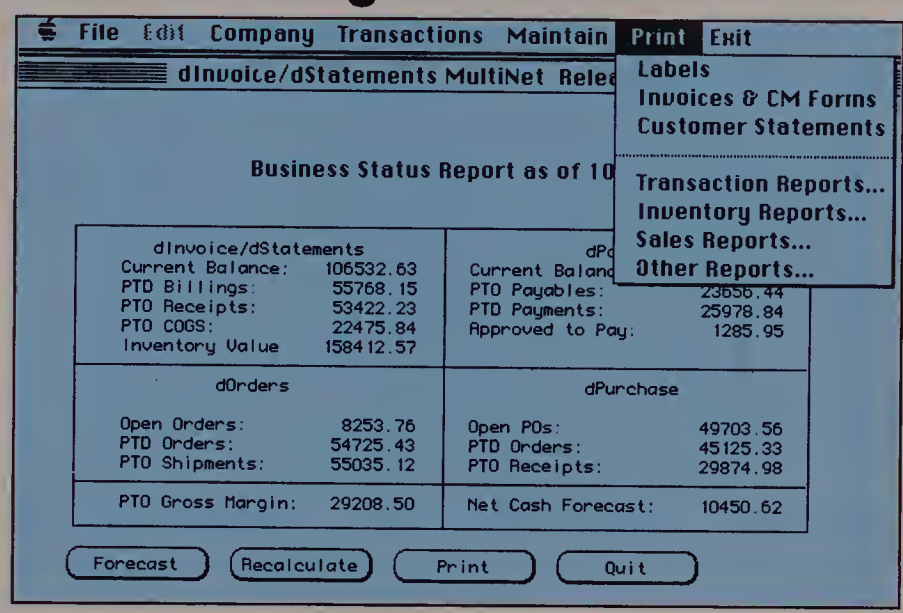

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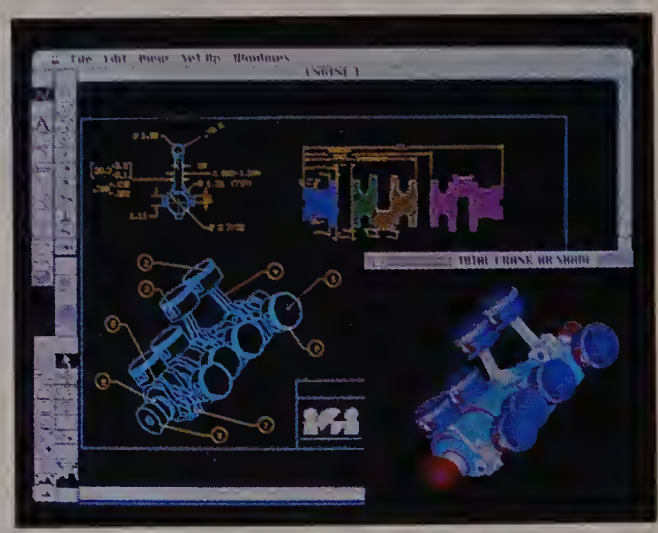
New Products

Makes increments automatically; has variable width lines and programming language. 2MB min. memory. $1945. Infinite Graphics, 612/721-6283.



In-CAD

InTouch Utility that works with the Optacon tactile imaging device to give Mac access to people with impaired vision. Displays parts of the Mac screen as the mouse is moved. Users interpret images from a tactile array of vibrating pins. 1MB min. memory. $395. TSI and Berkeley System Design, 415/540-5535.

MacBlast Data communications software for the Mac Plus, SE, and II. Comes with standard terminal emulation, supports MultiFinder for background file transfer, and provides connectivity with a variety of operating systems. 1MB min. memory. $195. Blast Communications, 504/923-0888.

MacBravo Workstation Software CAD/CAM applications for the Mac II. Modeler is for 3-D wire-frame modeling and mechanical design. Detailer is a mechanical drafting detailer. Modeler $1495; Detailer $1995. Schlumberger Technologies, 313/995-6000.

MacBravo Workstation Software

MacDiskManager Automatic disk-labeling system that prints labels using information from disk directory. Sold separately or with plastic pockets and label inserts. 128K min. memory. Kit $89.95; software only $59.95. Weber & Sons, 201/431-1128 or 800/225-0044.

MacLabeler Plus Disk-labeling program with four levels of automation. Use predesigned label templates or create your own. $79.95. Ideaform, 515/472-7256.

Magic Series Bundled series of Mac productivity tools. Contains FileMagic INIT file, WindowMagic for window control, and MultiMagic, which allows the configuration of multiple sets of applications and DAs. 512KE min. memory. $99. Magnus, 206/742-1633.

MaxPage Page-makeup software that imports and accepts files produced with most drawing programs. Allows text and graphics to be placed anywhere on the page. 512K min. memory. $89. Applied System and Technologies, 315/675-8584.

Minimum Requirements Spreadsheet program for small businesses to record and report transactions. Automatically generates profit and loss statements as well as a tax report. Excel and Full Impact versions available. 1MB min. memory. $29.95. Spreadware, 415/794-4388.

MultiDisk Disk-partitioning software with password protection that encrypts data within a partition. AppleShare and TOPS network users can remotely mount partitions. 512KE min. memory. $39.95. Alsoft, 713/353-4090.

NumberMaze Educational software for ages 5 to 12. Kids solve math problems while they wind their way through mazes. Math levels vary from simple counting to division and multiplication. Includes word-problem generator. 512K min. memory. $49.95. Great Wave Software, 408/438-1990.

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45 MB Removable Cartridge SCSI Hard Disk Drive

Micro/Removable Cartridge Hard Disk Drive

The Micro/Removable, 25 ms, 45 MB winchester hard disk is faster than some fixed hard disks. They are excellent for organizing related data or for fast back-up of fixed hard disk drives. The cartridges can be locked away for security or safely mailed to remote locations and have the reliability of a floppy diskette. You can boot from the removable, if needed, and the system is compatible with the Macintosh Plus, SE or Macintosh II. Utility includes password protection and a DA to mount volume.

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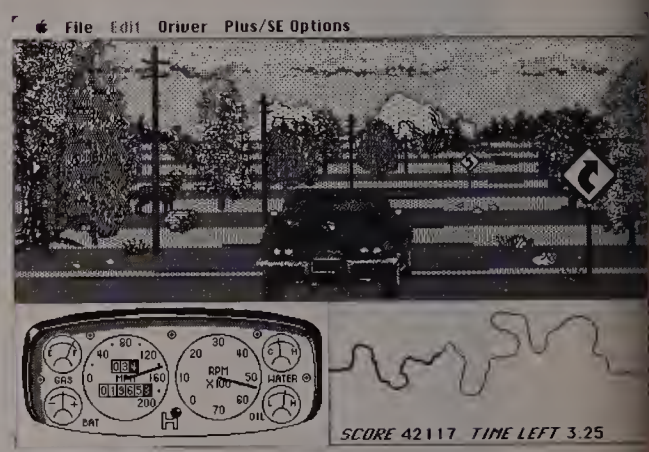
Printer Interface III Software to connect the Mac with the HP DeskJet printer. Uses all Mac fonts, Hewlett-Packard's built-in fonts or font cartridges, and standard interface cable. 512KE min. memory. $125. DataPak Software, 808/965-7796.

RoadRacer High-performance driving program that lets you maneuver a 1965 Corvette through five environments from desert flats to mountain roads. Features sounds, graphics, obstacles, and crashes. 1MB min. memory. $69.95. Practical Computer Applications, 612/427-4789.



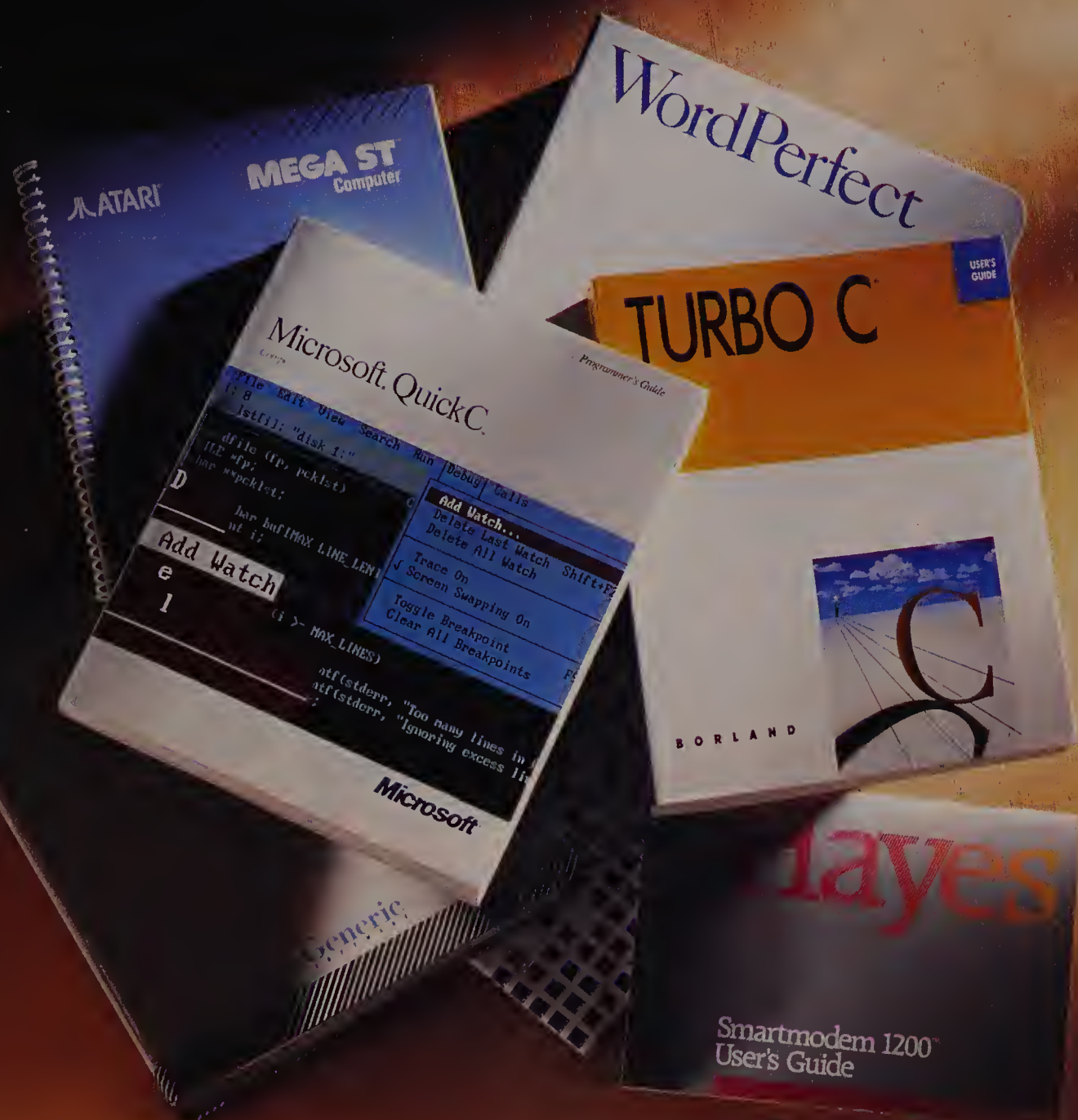
RoadRacer

Say & See Real-time speech processing software that displays animated cross section of the vocal tract. Designed for speech therapy, language lab use, and dialect and voice coaching. Ships with microphone and digitizer. 512KE min. memory. For price and licensing information, contact vendor. Emerson & Stern Associates, 619/457-2526.

Sports Award Library Award Library for Award Maker Plus with award styles for males and females, ten additional border styles, and four additional fonts. 512K min. memory. $29.95. Baudville, 616/698-0888.

SuperCard Software development toolkit creates customized applications. Includes color painting and drawing, graphics support, and sound and animation

(continues)



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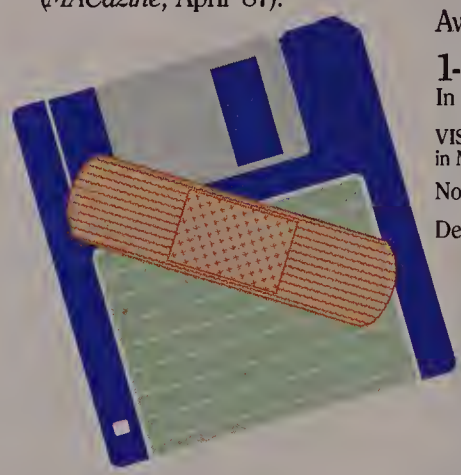

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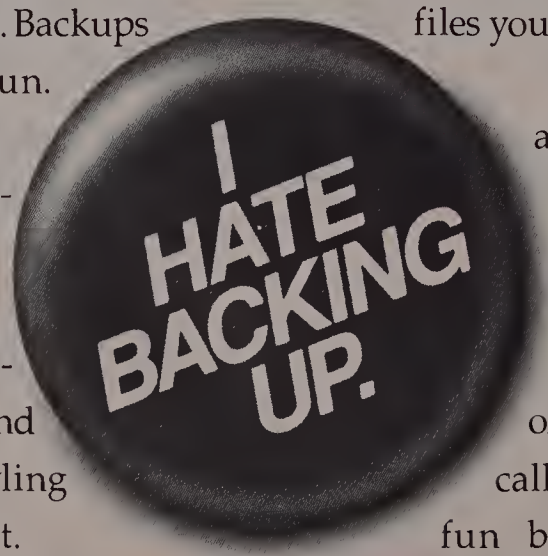

Redux by Dave Winzler

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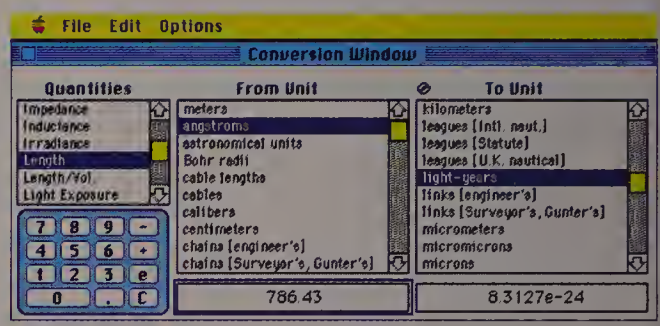
TCP/Connect TN3270X Communications package for TCP/IP networks that handles multiple active telnet sessions. Enables you to use File Transfer Protocol with Mac user interface and to use the Finger application. 1MB min. memory. $295. Intercon, 703/435-8170.

Unitize Unit conversion utility designed for scientists and engineers. Contains 150 different quantities (such as energy, pressure, time) and more than 1000 units of measure. Distributed as desk accessory or application. 512KE min. memory. $59.95. Rainbow Bridge Software, 513/984-6861.



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printers with Canon SX, Ricoh 4150, and Ricoh 4080/4081 engines. $795. Laser Connection, 800/523-2696.

Cate's Erase-A Label Disk-labeling kits with erasable laminated labels, erasing fluid, color coding labels, and pen. Available in kits of 50, 100, or 200 labels. 50-label kit $16.95; 100-label kit $26.95; 200-label kit $36.95. Cates & Company, 915/676-0844.

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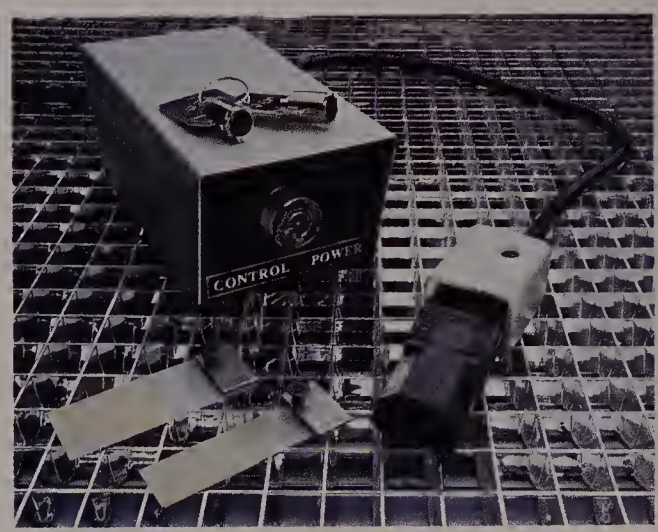
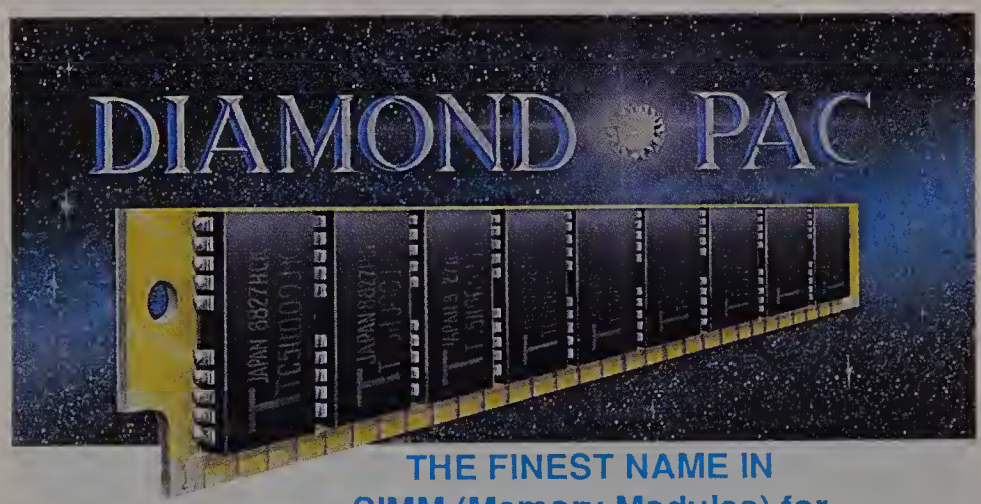
Mac II Stand and Extension Cables Combines Mac II stand, ADB Keyboard Cable, and Mac II Monitor cable extension kit. $99.95. Kensington Microware, 212/475-5200 or 800/535-4242.



Control Power

ExecutivePad

To have your product considered for inclusion in New Products, *send an announcement with product name, description, minimum memory, peripherals required, pricing, company name, and phone number to New Products Editor,* Macworld, *501 Second St., San Francisco, CA 94107. We reserve the right to edit submissions.* □



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Circle 26 on reader service card

William Lombardo, Modelmaking & Illustration
Created with Swivel 3D and PixelPaint

Roy Santiago, Business Presentation
Animated Swivel 3D images in VideoWorks

"A superb presentation tool... Swivel 3D raises the standard of 3-D graphics on the Macintosh."
Joost Romeu, MacWeek

"It's a speed-demon. It's your basic $395 must-have."
Salvatore Parascadolo, MacUser

"Creating objects with complex surfaces couldn't be easier...only Swivel 3D lets you cast shadows on images."
David Peltz, MacWorld

Jim Ludtke, Graphic Artist
Magazine illustration created with Swivel 3D.

"An amazing 3-D visualization tool that is easier to use than any of the 3-D packages...."
Laslo Vespremi, MacWeek

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Jack Davis, Verbum

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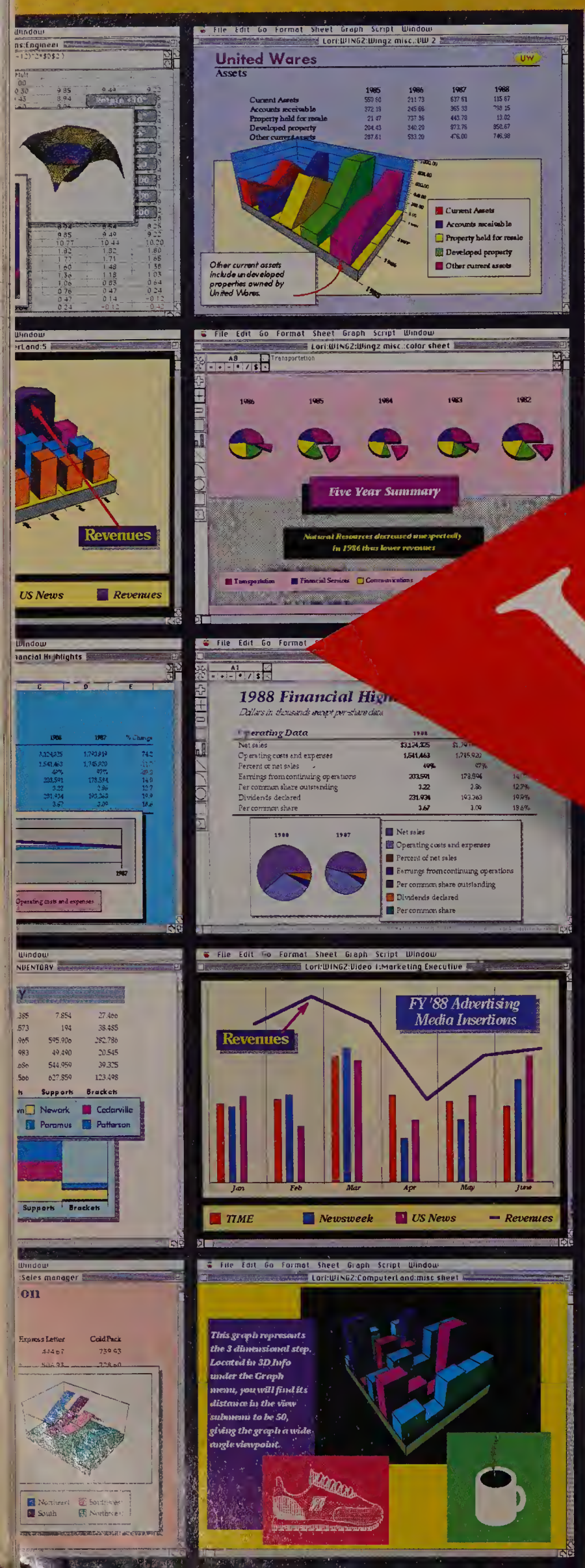

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Circle 477 on reader service card

Quick Tips

Answers to your questions

by Lon Poole

You can hush a Mac II by replacing the fan in its power supply with a fan that outputs less air, as I mentioned last January. However, Akbar Paydar, a senior mechanical engineer in Apple's design analysis department, has since cautioned that it's not enough to compare the unrestricted airflow of different fans. Installed inside a Mac II, a fan must overcome resistance caused by the closed cabinet and by cards and disk drives inside. If the fan motor is too weak, the fan will slow down too much and not maintain sufficient airflow. (Two bike riders may be able to maintain the same speed on a flat road with no wind, but the stronger rider can maintain speed going up a steeper hill or facing a stronger headwind.)

Paydar warns that inside a Mac II, even small changes in the fan speed can significantly reduce the longevity of chips on the logic board, the internal disk drive, and other components. He says Apple carefully researched the average and worst-case cooling requirements of the Mac II before choosing a fan, and Apple knows how much noise the fan makes, and continues to look for quieter, adequate solutions. (Warning: Replacing the fan will void the manufacturer's 90-day warranty and may void your AppleCare agreement, if you have one. Replace the fan entirely at your own risk.)

Airflow is measured in cubic feet per minute (cfm), and motor power is rated in amps. Apple's Panaflo-brand fan has a 0.45-amp motor and outputs 39 cfm. A $15 Radio Shack replacement (catalog number 273-243A) has as 0.19-amp motor and outputs 27 cfm. ComputerWare (415/496-1003, 800/235-1155, or 800/323-1133 in California) sells a $49 Panaflo replacement with installation instructions that has a 0.19-amp motor and outputs 32 cfm. If you decide to install a replacement fan, Brian Smythe, hardware manager at ComputerWare, suggests maximizing air throughput by means of a chimney effect by standing the Mac II on end, fan end up, with provision for air space on the bottom.

Lon Poole answers readers' questions and offers advice in his monthly Macworld *column. Many of the tips he's compiled can be found in his book* Mac Insights *(Microsoft Press, 1987) and in the more recent* HyperTalk *(Microsoft Press, 1988).*

Q ImageWriter Jam

The ImageWriter II at my office has a small black plastic device that fits around the left end of the platen. A wire attached to it appears to be some sort of ground. This contraption continuously mangles my printing and makes using ThunderScan a real hassle. My own ImageWriter II at home does not have this growth. What does it do and why is it bothering me?

Scott A. Hawk
Warminster, Pennsylvania

A You've identified part of the mechanical sensor that detects whether there's paper in the printer. The mechanical paper-out sensor can indeed cause paper jams. Newer ImageWriter II and ImageWriter LQ printers have optical sensors that don't require the black plastic part and don't cause jams. An Apple dealer can replace the mechanical paper-out sensor with the optical style. The parts cost about $10; labor will probably run between $40 and $50.

An optical sensor may not work properly on an ImageWriter whose platen has become shiny from accumulated ink and paper deposits (lint). A dirty platen may reflect light the way a piece of paper does, whereas a clean platen does not. If the ImageWriter keeps printing after the paper runs out, replace the platen or clean it with a solvent such as Fedrol.

Incidentally, an optical sensor doesn't work with plain transparent film, because the sensor sees the black platen through the transparency. Use transparent film with a white paper backing.

Q LaserWriter Downgrade

I recently had my LaserWriter upgraded to a LaserWriter Plus. The test page now prints "LaserWriter Plus" instead of "LaserWriter," but shows a 2.0 where it used to show a 3.0. Do I have PostScript version 47? What are the advantages of version 47?

Thomas E. Burke
Bryan, Texas

A The 2.0 corresponds to PostScript version 38 and the 3.0 corresponds to PostScript version 47. Apparently your LaserWriter had the newer version but the upgrade kit that was installed in it had the older version. Your printer was probably built after October 1987, when Apple switched versions. The upgrade kit was probably built before that date and sat in inventory until you got it.

Apple claims that version 47 constructs fonts up to 25 percent faster and processes bitmapped images up to 40 percent faster than version 38. So take your LaserWriter back to the place that "upgraded" it and insist that the version 47 upgrade kit be installed.

Q Boosting Network Performance

I represent a company in Spain that has an AppleTalk network with a Mac II, a Mac Plus, and a 2-megabyte Mac 512K. We use the MacServe file server with a 40MB hard disk on the Mac II. When we do

(continues)

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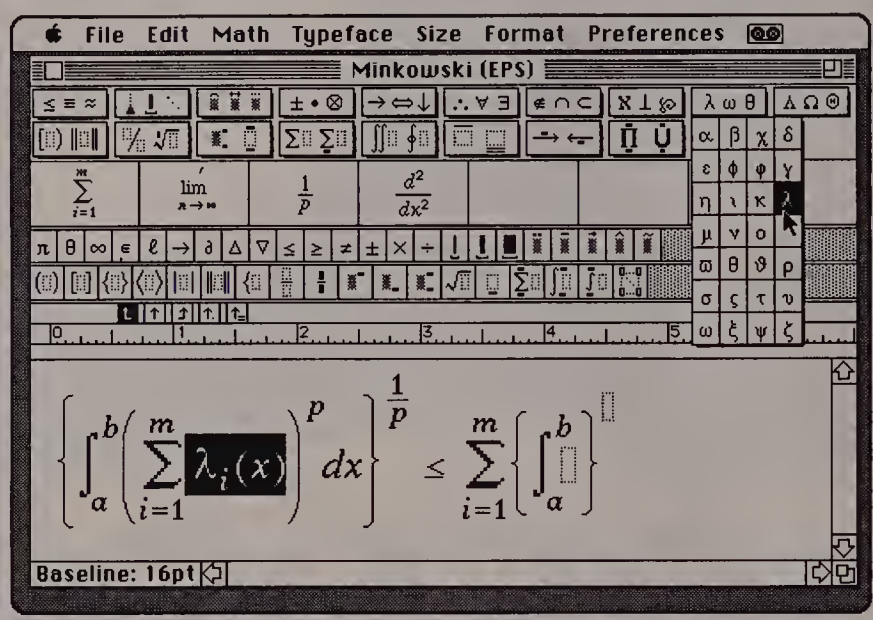

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a report using the Omnis 3 Plus database manager, it ties up the file server. How can we increase the speed and capacity of the network?

Juan C. Aeschmann
Los Altos, California

A The answer to this question comes from Dave Kosiur, a *Macworld* contributing editor, who publishes and edits *Connections,* a newsletter about Macintosh networks (for subscription information, call 714/738-1492).

Kosiur says you can improve network performance by replacing MacServe with a faster file server. Kosiur finds that the TOPS file server from TOPS (415/769-8700 or 800/445-8677) is about three times as fast as MacServe, and it costs only $249 per Mac. At $799 per network, Apple's AppleShare file server is a bit faster than TOPS but requires an extra Mac to be used as a dedicated file server.

You can also speed up a network by increasing data-transmission speed. Two new products claim to accelerate data-transmission speed by as much as two or three times when you use standard LocalTalk or PhoneNet cabling. FlashBox from TOPS and DaynaTalk from Dayna Communications (801/531-0600) are both small, $189 adapter boxes. You connect one to the printer port of each Mac you want operating at the higher speed and connect the LocalTalk or PhoneNet wiring to the adapter boxes.

If your network has multiple Mac IIs or Mac SEs, you can boost data transmission speed three to five times among them by using EtherTalk—an AppleTalk network running on Ethernet cables. Each Mac connected to an EtherTalk network must have a $700 Ethernet adapter card installed, and the Macs on the EtherTalk network must be wired together using Ethernet cable. You can connect other Macs using LocalTalk or PhoneNet wiring and interconnect that network with the EtherTalk network using a bridge, such as the $2495 FastPath from Kinetics (415/947-0998).

Q **Fonts for LaserWriter IISC and ImageWriter LQ**

Does anyone sell fonts in large sizes for best-quality printing on a LaserWriter IISC?

Ted H. Gordon
San Rafael, California

(continues)

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"This program is so good that if it's the first one you test, I can almost guarantee you it will be the only one you test." **"Computer Output" column** Oshawa Times (Toronto)

"My favorite all-around accounting program is CheckMark Software's **MultiLedger/Payroll** set. It was the simplest and most logical program I examined that provided a reasonably full set of accounting capabilities. Its price/performance ratio represents an excellent value." **Macworld** September 1988 / page 169

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Printed Font Sizes			Font Size Needed
LaserWriter IISC (4:1)	**ImageWriter LQ** (3:1)	**ImageWriter I & II** (2:1)	
	6	**9**	18
5		**10**	20
6	8	**12**	24
7		**14**	28
	9		27
	10	15	30
9	**12**	**18**	36
10		20	40
	14	21	42
	15		45
12	16	**24**	48
	18	27	54
14		28	56
15	20	30	60
18	**24**	36	72
24	32	48	96

Font Reduction
This table shows the size of the bitmap font that must be installed to get a particular actual size when printing best quality using any of these Apple printers. The most commonly used sizes appear here in boldface print. Fractional sizes have been omitted.

A number of companies make bitmap fonts in a full range of sizes from 9-point to 96-point. You can use the large sizes for best-quality printing in popular sizes between 9- and 24-point on a LaserWriter IISC. As you may know, the LaserWriter IISC achieves its 300-dots-per-inch resolution by printing fonts one-fourth their nominal size. For example, a 96-point font prints at 24-point. Along with the LaserWriter IISC font sizes, most companies include sizes for best-quality printing on an ImageWriter LQ, which prints fonts one-third their nominal size. Many of the LaserWriter IISC and ImageWriter LQ font sizes can also be used for best-quality printing on an ImageWriter I or II, both of which print fonts half size. The table "Font Reduction" correlates various sizes of installed bitmap fonts with actual printed font sizes using these Apple printers.

Bitstream (800/522-3668 or 617/497-6222) has bitmap versions of all 35 PostScript fonts—11 font families—that are standard on a LaserWriter IINT. Called SoftFonts, they come in sizes for best-quality printing on the LaserWriter IISC and ImageWriter LQ. You can get a bitmap version of Garamond in large sizes from Casady & Greene (408/646-4660).

Modem to Mouthpiece

Tip: Travelers, students, and office workers who want to use their Macs with modems all face a common problem if their hotel rooms, dormitories, or offices have telephones without modular connections. All modems that operate at a reasonable speed—1200 baud or faster—require modular connections. You can resolve this problem by connecting the modem to the mouthpiece of a standard telephone handset.

If you unscrew the mouthpiece and remove the microphone from the handset of a standard telephone, you see two metal prongs. You can make a cheater cable to connect the prongs in the handset to the modular RJ11 jack on the modem: you need a standard modular line cord with RJ11 connectors at each end (not a curly handset cable), two miniature alligator clips, a soldering iron, and some solder. Cut the line cord into two pieces. Next carefully remove a couple of inches of the outer plastic casing from the cut end of one of the pieces, exposing four colored wires. Then strip the insulation from the red and green wires

(continues)

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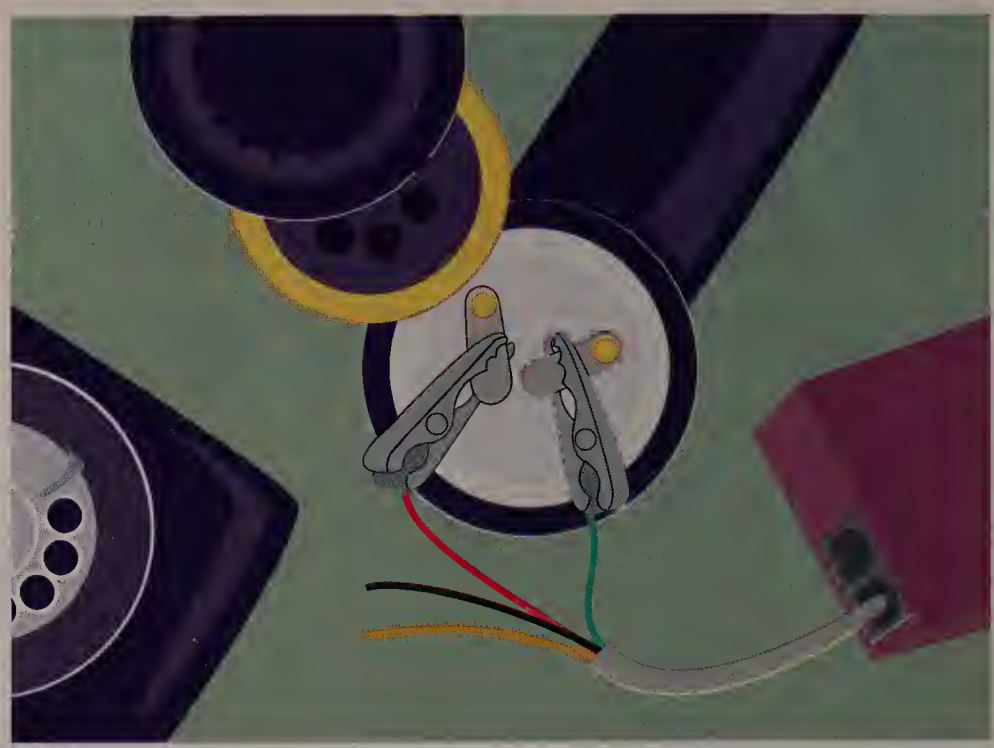

Modular Bypass
If you don't have access to a modular wall jack, you can attach the red and green wires of a line cord to the prongs inside the mouthpiece of most telephone handsets.

and solder each to an alligator clip. The yellow and black wires are unused.

To use your cheater cable, attach the alligator clips to the handset prongs and plug the modular connector into the modem, as shown in "Modular Bypass." If the phone line is touch-tone compatible, proceed as if the modem were connected to a modular wall jack. Even if you tap into a rotary dial phone, its phone line may be able to handle touch-tone signals from the modem.

If the phone line requires rotary (pulse) dialing, then you must dial the number manually with the telephone. Using a communications application that lets you type commands to the modem (Microphone, Red Ryder, FreeTerm, and others), type the command **ATH1** to take the modem off-hook. Be sure to type all capital letters for modem commands. Take the phone handset off the cradle and use the phone to manually dial the number you want to reach. If the modem has a speaker, you will hear it echo the pulse sounds of dialing. As soon as you hear the carrier tone from the remote computer, type the command **ATO** (that's the letter *O*, not a zero) to put the modem online. Now you're connected.

If you don't want to bother with soldering and alligator clips, you can buy the $49.95 Black Jack connector manufactured by Digital Systems International (206/881-7544). It temporarily replaces the mouthpiece with a modular jack, so you can attach a modem using a standard modular line cord. Digital Systems claims to have sold over 23,000 of them worldwide.

Richard P. Adams
Yellow Springs, Ohio

You can dial manually with AppleLink, MacNet, and CompuServe Navigator, all of which normally automate the dialing process. Simply set the phone number that the application dials automatically to a capital O. In AppleLink, for example, you set the phone number using the Setup command in the Network menu. Then dial the number manually using the phone and immediately initiate the standard connect procedure in the application. Again in AppleLink, choose Connect from the Network menu, type your password, and click on the Connect to Network button.

I tried this technique with several different phones, and it worked with all but one of them.

Numbered Names in Order

Tip: If you use numbers to differentiate similar file and folder names, those names may not be arranged as you'd like in the Finder's By Name view or in Open dialog boxes. For example, the name Q10 appears between Q1 and Q2, not following Q9. To work around this problem, put a space before the digit in names with single-digit numbers, and no space before the digits in names with two-digit names. This strategy makes Q10 follow Q9, not Q1, for example. If some names have three-digit numbers, you must prefix single-digit numbers with two spaces, two-digit numbers

(continues)

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with one space, and three-digit numbers with no space.

Peter Ansin
Santa Monica, California

Hiding the HyperCard Pointer

Tip: If you'd like to hide the pointer while using HyperCard's Browse tool, press the slash (/), asterisk (*), plus (+), or minus (-) key on the numeric keypad.

Tim Cushing
El Paso, Texas

All other keys have the same effect if the User Level property is less than 5 (Scripting) or if that property is 5 and the Blind Typing property is true. But for the four keys you've mentioned, HyperCard always acts as if Blind Typing were true.

Parallel Lines

Tip: When you need to place parallel lines close together in Cricket Draw, Illustrator, or FreeHand, it's hard to avoid overlapping them. They look OK on screen but print as one thick line. Instead of using two lines of identical thickness, superimpose a thin white line over a thicker black line. For example, draw a thick black line, copy it, paste it exactly over the original, and change the copy to a narrow white line. To get parallel dashed lines, overlay a thick patterned line with a thin white line.

Peter Breis
Artarmon, NSW, Australia

This technique also works in MacDraw II. A variation of it lets you create lines thinner than 1 point—not normally possible in MacDraw II. For that effect, cover one edge of a black or patterned line with a white line.

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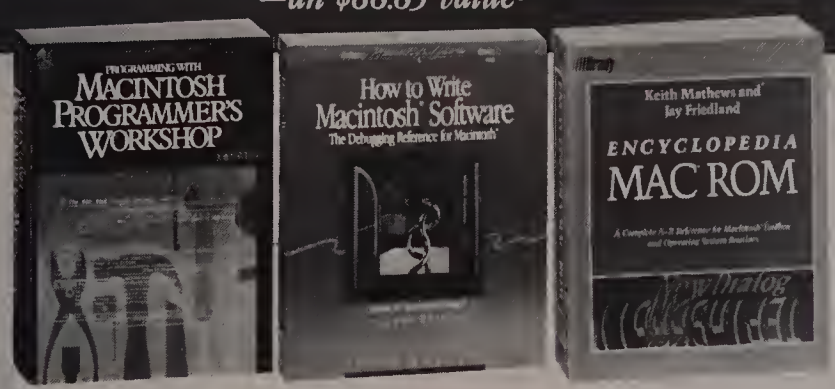

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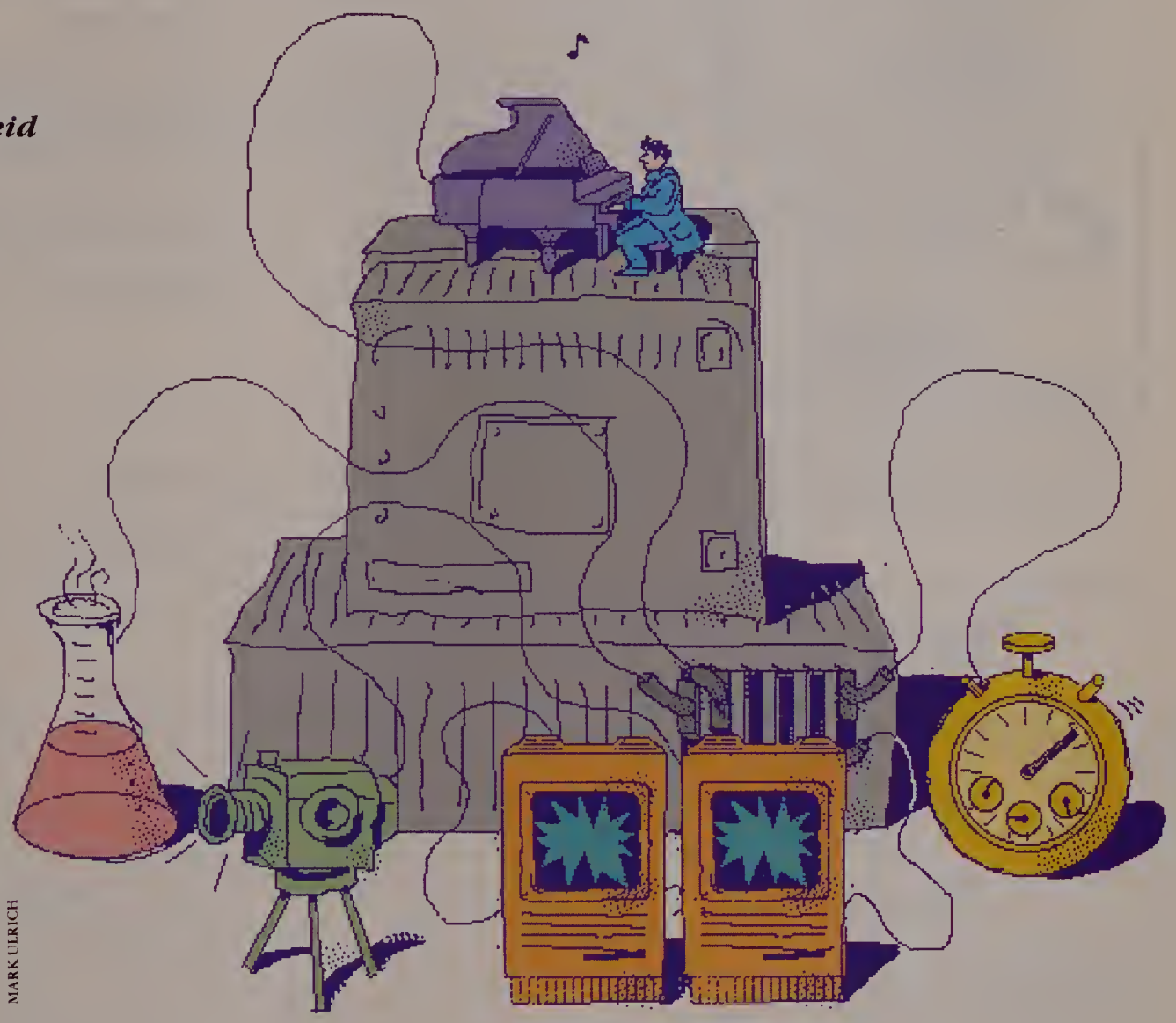
Getting Started with Expansion Slots

A survey of expansion options for the Mac SE and the Mac II

by Jim Heid



MARK ULRICH

Expansion slots make a computer more versatile and provide insurance against obsolescence. These internal receptacles for optional *expansion boards* open the Mac to a world of hardware options, from large-screen video monitors to high-speed processors, to music and networking boards.

But some people believe that slots create compatibility problems and are intimidating and inconvenient. Design a computer right to begin with, they say, and slots are unnecessary.

You wouldn't expect a plastic connector and a few dozen polished pins to create controversy, but in the early days of the Mac's gestation, the debate over whether or not to give the Mac expansion slots was a furious one. The original Mac eventually debuted with a sealed case and little hope for internal expansion. Were it not for its ease of use, it might have died a quick death at the hands of the IBM PC—which, like most personal computers, has slots.

Why the fuss over expansion slots? After all, you can plug add-ons into the Mac's external modem, printer, and SCSI ports. What do slots offer that the Mac's ports don't?

A great deal. This month, we journey inside the case to look at how the slots in the Mac SE and the Mac II work, and at what's available to fill them. "Recommended Reading" lists some past *Macworld* articles that discuss expansion-related topics.

Jim Heid is a Macworld *contributing editor who each month focuses on a different aspect of Mac fundamentals. He is at work on an advanced user's guide for the Mac, to be published this year by Brady Books.*

This Bus Is Never Late

To understand the benefits of slots, you need to understand the *bus*—an internal freeway that carries data between the Mac's memory, its microprocessor, and a variety of support chips—bit players that perform small but vital roles in the Mac's operation. Some of these support chips act as intermediaries between the bus and the Mac's external ports.

All Macs contain two primary buses: the *address bus,* which carries signals from the microprocessor that specify where in memory data is to be stored or retrieved; and the *data bus,* which carries the data itself. With only a few exceptions, all the data that moves within the Mac does so on its data bus. Thus, the speed of the bus plays a major role in determining the Mac's overall performance.

Just as only one vehicle at a time can squeeze through a toll booth, only one component in a Mac can use the bus at any given time. A device gains access to the bus by sending signals on one of several spe-

(continues)

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Mac II color monitors	"Color Monitors Revisited"	August 1988
Expanding the Mac Plus	"Staying Alive"	August 1988

Recommended Reading

For more information on expansion-related topics, consult these previously published Macworld *articles.*

cialized *control lines* that carry control and status information. A device usually has access to the bus for the duration of one *clock cycle*—one heartbeat as defined by a quartz crystal vibrating millions of times per second.

The SE's internal clock ticks some eight million times per second. The II is faster than the SE, not only because its clock hums at about twice that pace, but also because of its *bus width*—the number of bits the bus can carry during one clock cycle. The SE has a 16-bit data bus and can thus move 16 bits of data during one clock cycle. The II, with its 32-bit data bus, can move twice the amount of data—and thanks to its faster clock rate—in half the time. (Of course, other factors contribute to the II's speed, including its 68020 microprocessor—or 68030, in the IIx—and its more efficient SCSI hard-disk port and video circuitry.)

When Bus Meets Slot

When you consider the significant role the bus plays, the advantages of tapping into it become clear. With direct access to the microprocessor, to memory, and to many of the timing and control signals inside the Mac, a device connected to the bus becomes an integral part of the Mac. Many expansion boards are able to supplement or even supplant the Mac's microprocessor with their own—more about that later.

Another advantage is speed. A device connected directly to the bus can transfer data and communicate with memory far faster than it could using one of the Mac's external connectors. In an SE, the SCSI port transfers data at about 656,000 bytes per second; a board in the SE's expansion slot can access memory at over 3 million bytes per second. Yes, there's always a benefit to eliminating the intermediary.

Before the SE and the II arrived, attaching a device directly to the bus required some devious hardware designs. To shoehorn internal hard disks into early Macs, pioneering Mac hardware manufacturers such as Levco and GCC Technologies (formerly General Computer) accessed the bus by attaching a large clip to the 68000 microprocessor. But the clip's contacts could loosen or corrode over time, causing unreliable operation. Some modifications complicated servicing and voided Apple's warranty. And the extra circuitry could overload and overheat the Mac's fanless power supply.

Slots solve all that. If the bus is a freeway, then a slot is a set of on and off ramps, ready to accommodate high-performance add-ons without clips, voided warranties, or fried power supplies.

(continues)

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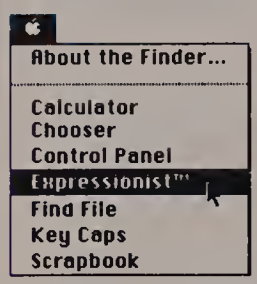

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- *MacWorld magazine, February 1989*

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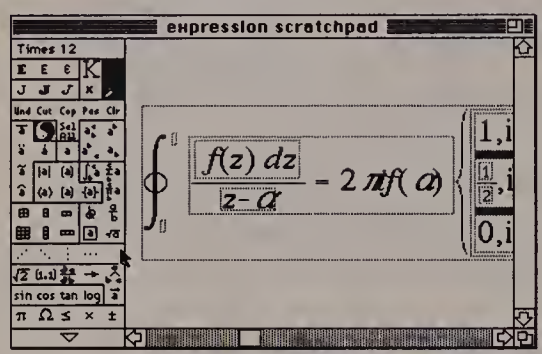
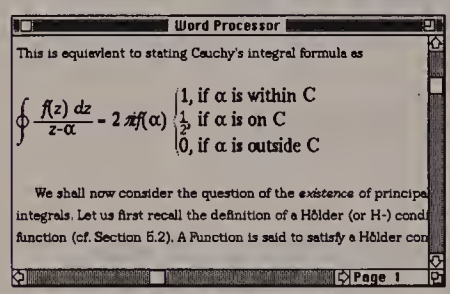


2.) Create your equation ...



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Surveying the Slots

The SE contains one expansion slot; the II contains six. The slots in both machines have 96 pins, but the similarity ends there. The SE's slot provides direct access to the SE's internal bus, but it's far less sophisticated than the Mac II's slots.

The Mac II's slots are based on a bus standard called *NuBus,* developed at the Massachusetts Institute of Technology and refined in 1985 by a standards committee comprising representatives from MIT, AT&T, Texas Instruments, Apple, and others. The NuBus standard specifies everything from how expansion boards access the internal bus to such nitties as the distance between the slot's pins.

The Mac II's NuBus slots overcome two of the classic drawbacks of slots: forcing users to fuss with small switches inside the case that tell the computer what hardware they've installed, and making it harder for software developers to write software that runs on different system configurations.

Every NuBus board contains a *configuration ROM*—a read-only memory chip that identifies the board and describes its capabilities. When you switch on the Mac II, it consults each board's configuration ROM and then sets up your system accordingly. Thus, installation is usually a plug-and-play proposition.

Apple tackled the software compatibility problem by designing the Mac's system software to act as an intermediary between application programs and hardware. Properly written Mac programs never access hardware directly; instead, they use Macintosh Toolbox routines, which access the hardware. So as long as software developers follow Apple's guidelines, their programs will run on any Mac, regardless of the boards it contains.

What kind of goodies can slots accommodate? Glad you asked. What follows is a sampling of boards for the SE and the II—not a complete list, but a starting point for your hardware shopping spree.

Speed Thrills

Computer speed is like money: you can't have too much, and most people say they don't have enough. *Accelerator boards* such as the Radius Accelerator, GCC's HyperCharger 020, and Levco's Prodigy 4 boost the Mac's performance by replacing its microprocessor with a faster one. As I write this, I'm being pressed into the back of my chair by a Radius Accelerator 25, an SE accelerator board boasting a 68020 running at 25MHz—25 million clock ticks per second, versus the stock SE's 8MHz and the II's 16MHz. Like most SE accelerators, the Radius Accelerator is available with a 68881 *math coprocessor,* a specialized microprocessor with a head for math.

Some SE accelerator boards, such as MacPeak's Orion SE, also boost the Mac's main memory. The Radius Accelerator doesn't, but it does contain 32K of *cache memory*—high-speed memory that stores the most recently used data or program instructions and supplies them to the 68020 microprocessor if they're needed again. Why put additional memory on an accelerator board rather than on the SE's main board? Performance. 68020 accelerator boards have 32-bit data buses, versus the SE's 16-bit bus. Thus, the 68020 can access the accelerator board's memory faster than it can the Mac's. And how—the Radius Accelerator 25 has made me impatient with my Mac II.

Not that the II is being ignored. DayStar Digital, MacPeak, Siclone, and others have announced Mac II accelerators whose 68030 microprocessors run at a blistering 33MHz. Most also contain on-board cache memory. Some, such as MacPeak's Orion II, contain the newer 68882 math chip, which is considerably faster than the Mac II's stock 68881.

Now See Here

It used to be you could have any kind of Mac screen you wanted, as long as it was black and white and measured 9 inches. That's changed. *Video boards* allow you to tailor the Mac's display circuitry to your needs.

Unlike the SE and other small Macs, the Mac II contains no video circuitry. When you buy a Mac II, you'll also buy a video board. Most Mac II buyers opt for Apple's video board, a capable board that produces up to 256 colors or gray shades. Users of desktop publishing or drafting software, however, may choose a large-screen monitor-and-board combination from such vendors as Moniterm, Radius, E-Machines, or SuperMac. By showing one or two actual-size pages at once, such monitors reduce tedious scrolling and zooming.

For color graphics applications, you might consider one of the new breed of *24-bit* color boards. By tripling the num-

(continues)

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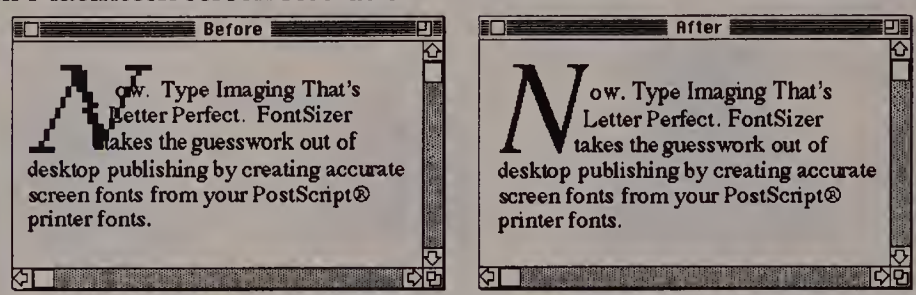

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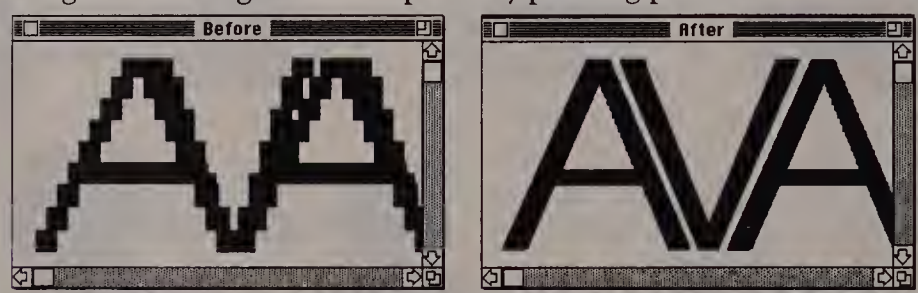

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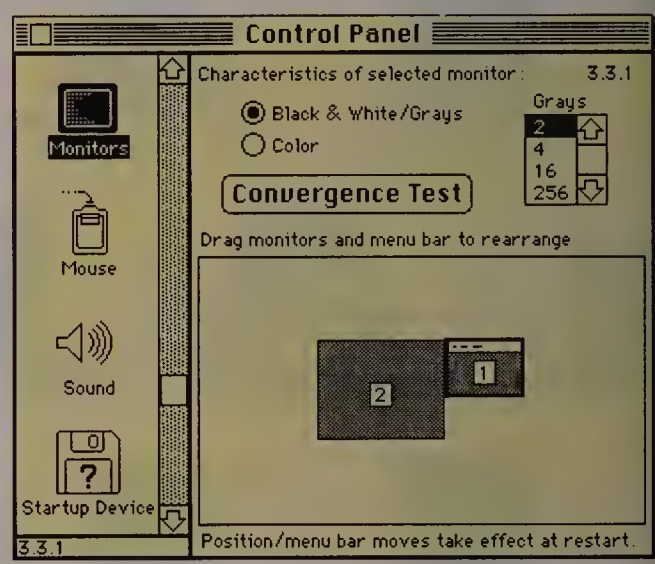
ber of bits assigned to each screen pixel, boards such as Jasmine's Rembrandt II and SuperMac's Spectrum/24 provide direct access to 16.7 million colors. But tread this path carefully, because at this writing, the Mac's system software doesn't support 24-bit color boards. To provide 24-bit color capability, some board makers have *patched* Color QuickDraw, the Mac II's graphics routines. When Apple releases its new Color QuickDraw (which will support 32-bit color), many boards may require software updates.

Unlike many computers, the Mac II doesn't make buying a video board an either-or proposition. The II has the remarkable ability to house several video boards and treat their monitors as one huge screen area—even if each monitor provides different color or gray-scale capabilities. You can drag windows from one monitor to another, or even position a window to span across monitors (see "Mac II Monitors").



Mac II Monitors

The Mac II can accommodate several video boards and treat their monitors as one huge screen area. You specify how multiple monitors interact using the Monitors option of the Control Panel desk accessory.

As for the SE, its video options generally involve large-screen monochrome monitors. Their boards contain the additional memory needed to hold the bits that represent a large-screen image, and also contain circuitry that speeds the screen-painting process. Many SE video boards include software that lets you use the SE's screen to hold windows or tool palettes—much like the Mac II's multimonitor mode. Radius boards even let you detach menus from the menu bar and keep them on the screen, where their commands are only a click away.

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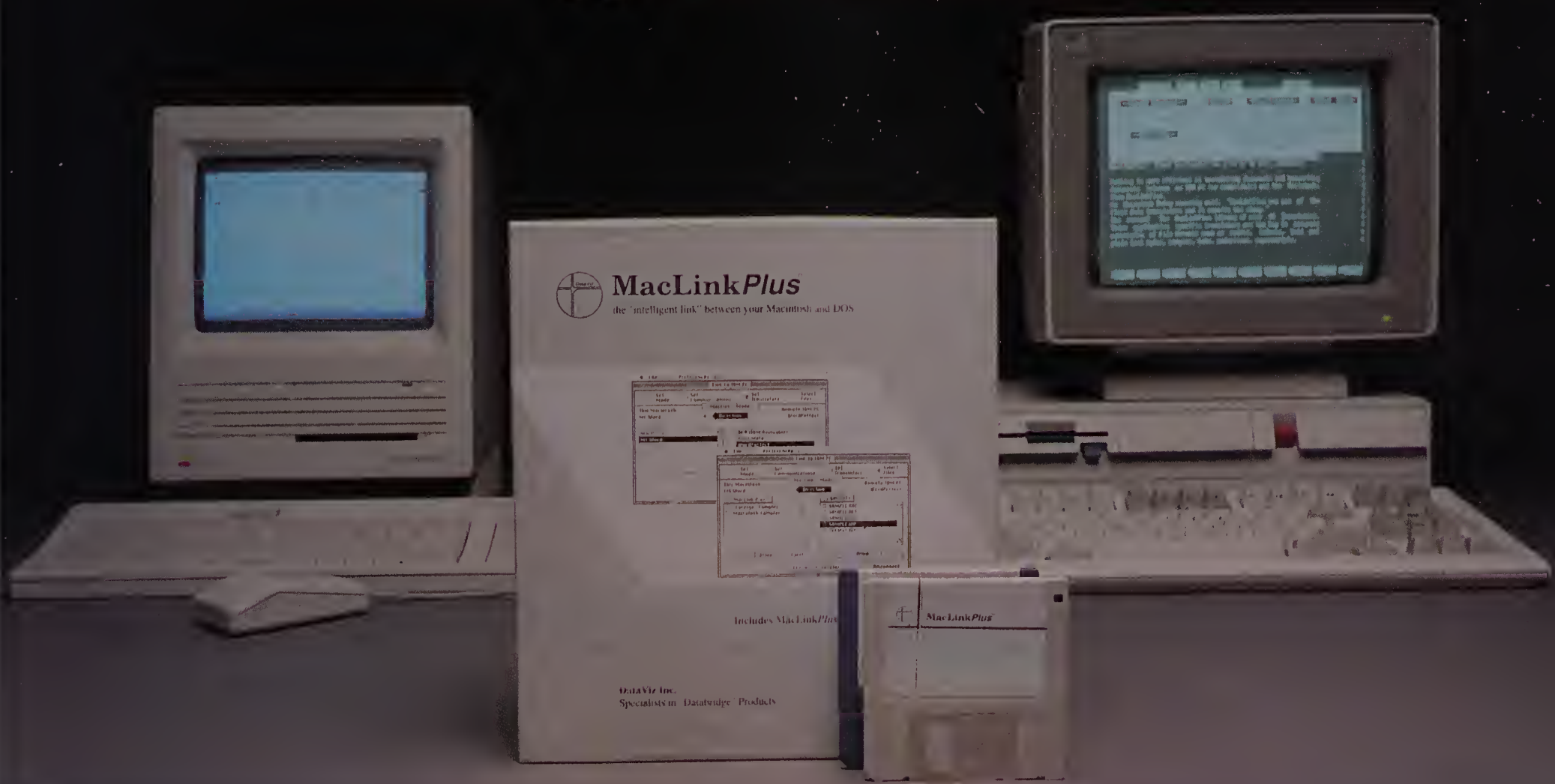

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Although the SE has but one slot, you can install an accelerator board *and* a large-screen video board. The Radius Accelerator sports a special slot that accommodates Radius's Full Page Display and Two Page Display boards. GCC's HyperCharger 020 works with E-Machines' Big Picture boards. Other combination platters exist, so if you want both add-ons, shop for boards that work together.

Can We Talk?

As Macs infiltrate large businesses, more of them are being forced to communicate with mainframes, minis, and other personal computers. The Mac's built-in LocalTalk circuitry is ideal for small networks that share laser printers and hard disks, but it's too slow for the industrial-strength networking needs of big business.

Networking boards from Kinetics, AST Research, and Apple allow SEs and IIs to join high-speed networks built around the *Ethernet* networking protocols, a high-speed networking standard.

Ethernet has three big strengths. First, it's fast—able to transfer data at up to 10 megabits per second, versus LocalTalk's 230 kilobits per second. Second, it's popular. Ethernet hardware is available for Macs, IBM PCs, Digital Equipment VAXs, UNIX workstations, and even Cray supercomputers. Third, it's versatile. As a *multiple protocol medium,* Ethernet can simultaneously support several networking protocols—rules that specify how the computers and peripherals on the network communicate. That versatility means you can unite disparate computers without having to use different cabling schemes for each.

A variation on the communications theme involves installing an *internal modem* for communicating over phone lines with mainframe computers and information services such as CompuServe. In the IBM PC world, internal modems are common. But limitations of the Mac's system software have kept modems outside the Mac until just recently. One of the first internal modems for the Mac II, Hayes's Smartmodem 2400M (which should be shipping by the time you read this), installs in a Mac II slot and can be used by other Macs on a network, eliminating the need to equip each Mac with its own modem.

From Science to Sound

Another benefit of expansion slots is that they allow a mass-market computer to accommodate a potpourri of highly specialized hardware. *Data acquisition* boards, for example, enable the Mac to connect to scientific and engineering equipment. The MacADIOS boards from GW Instruments use *analog-to-digital* converters to translate incoming electrical current from measuring devices, audio systems, or lab equipment into digital data that the Mac can store, analyze, and display in graphical form. With the appropriate software, data acquisition boards can turn the Mac into an oscilloscope, a chart recorder, or even a digital audio recorder.

Speaking of sound, the debut of Steve Jobs's Next computer has sparked new interest in *digital signal processing (DSP)* boards. Boards such as Digidesign's Sound Accelerator and Southworth Music's Max Audio (both available for the SE or II) use the Motorola DSP56001 signal-processing chip, designed to manipulate massive amounts of data in real time—a necessity for recording and playing back sound.

(continues)

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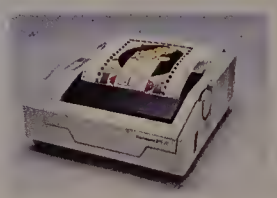

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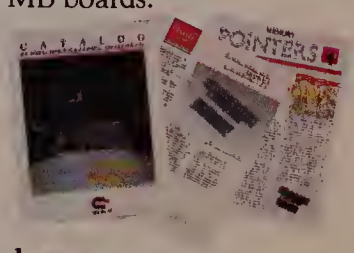

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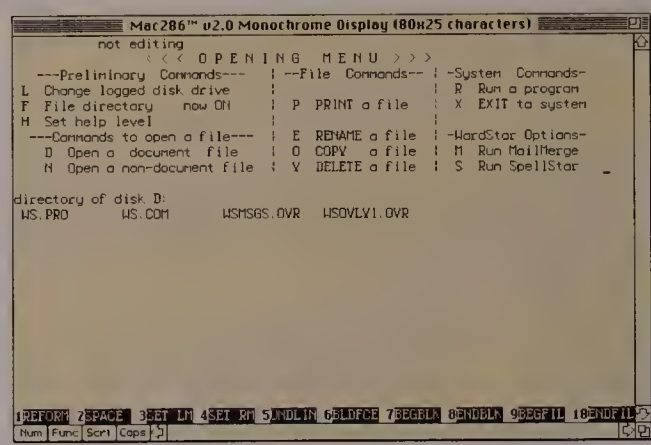
Today's DSP boards are primarily used to turn the Mac into an audio workstation capable of recording, playing, and editing digital audio. In the future, look for DSP chips to work their way into high-speed modems, voice mail and speech-recognition systems, and even image-processing and graphics hardware.

The DSP board is a form of *coprocessor board*—an expansion board containing a specialized processor that works with rather than replaces the Mac's. Another category of coprocessor board performs an equally specialized task: it allows the Mac to run IBM PC software (see "Mac Meets IBM"). AST Research's Mac286 and Mac86 boards—for the II and the SE, respectively—contain the same microprocessors that govern IBM PCs and compatibles. The boards themselves cost almost as much as some low-cost IBM clones, but they do simplify file transfers and are finding a home in corporations where IBM compatibility is a requirement.

Finally, I'd be remiss if I didn't mention Mac II *memory boards* such as National Semiconductor's NS8/16, which is designed to work with A/UX, Apple's version of the UNIX operating system. In the IBM PC world, memory boards make up a large percentage of the expansion board population. They're less common in Macs because the Mac uses a different means of expanding memory: tiny boards called *Single Inline Memory Modules (SIMMs)* that plug into sockets on the main board. SIMMs can expand an SE's memory to 4MB, and a Mac II's memory to 8MB.



Mac Meets IBM

This is progress? With AST's Mac86 and Mac286 boards—for the Mac SE and II, respectively—the Mac can run IBM PC software. Here, a Mac II is running WordStar, the venerable PC word processor by MicroPro International.

Slot Caveat

I've painted a rosy picture of the flexibility of Mac expansion slots, but problems and incompatibilities do sometimes surface. Make sure the boards you choose work with the software you use. And if you doubt your ability to install a board, let a dealer do it for you. Mac II boards are easy to install, but working within the SE requires dexterous hands and special tools. High-voltage components may cause physical harm to you as well as to the machine. In addition, you void the Apple warranty the minute you open the machine.

And what if you own a slotless Mac? Some accelerator boards and even large-screen video boards are available for the Mac Plus, but if expansion is important to you, you're better off selling your old Mac and buying an SE or a II. After all, they're among the few computers in which playing the slots isn't a gamble. □

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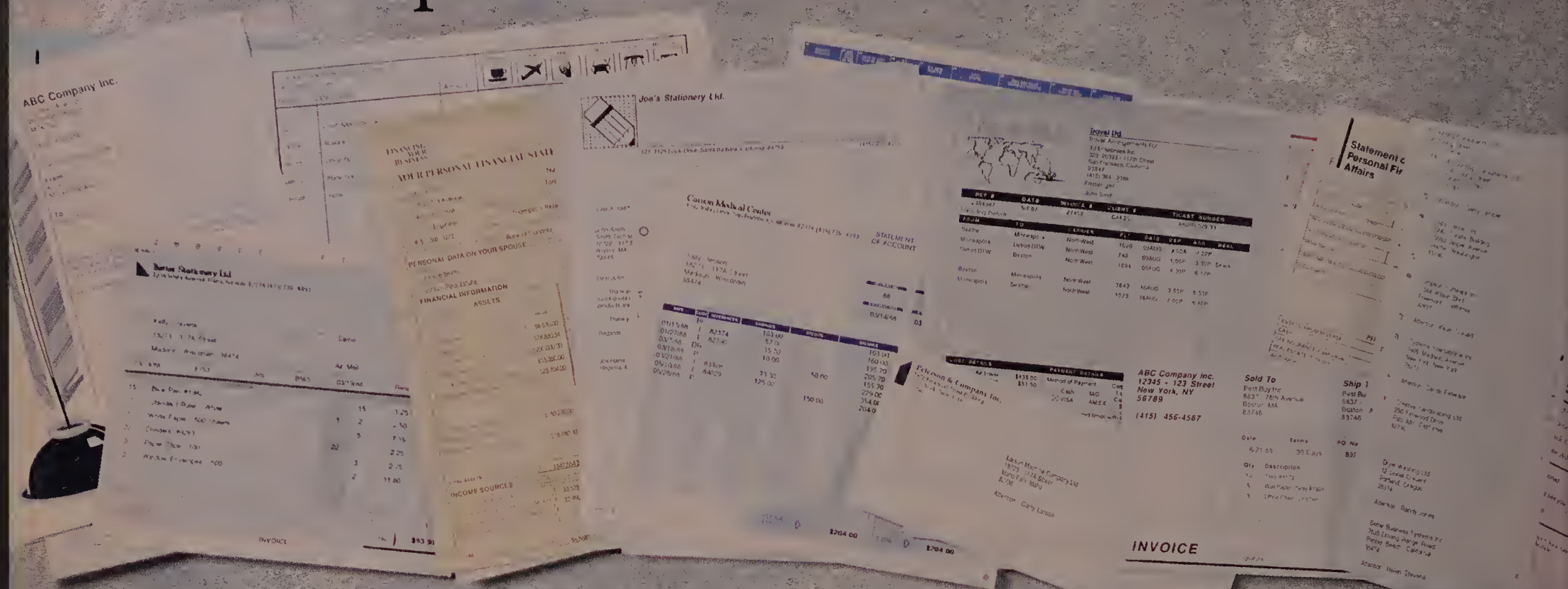

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Insights on FileMaker II

Fifteen tips offer database savvy

by Tom Negrino

The spirit of Charles Darwin is alive and well in today's software industry. Even excellent software must evolve and improve to stay competitive in the marketplace. A case in point is FileMaker, now published by Claris Corporation. This powerful, easy-to-use database manager has grown through three major versions and as many publishers.

FileMaker II adds many new features to FileMaker Plus. (FileMaker II is basically the same program as its predecessor, FileMaker 4, from Nashoba Systems; Claris changed the product's name and fixed some minor bugs after acquiring Nashoba in 1988.) Form creation, always a strong area for the program, was made easier with the increase and improvement of the tools available for layout design. The program is now multiuser over a LocalTalk network and can be networked with or without file-server software such as AppleShare or TOPS.

My thanks to FileMaker power users Phyllis Hurwitz, Tim Winders, Peter McKone, and Claris's Dennis Marshall for sharing their expertise. Additional thanks go to Joe Kroeger and Keith Kiel of the *FileMaker Report,* an excellent source of information on the program.

JONATHAN LEVINE

Douglas MacKay runs the Packer Printing Company of Mystic, Connecticut, by using FileMaker to generate daily reports for many aspects of his business.

Compatibility Pays Off

If you're like most people, you create more than one database in order to meet several different needs. Try to use the same field names for similar fields in all your files. (Don't use *Zipcode* in one file and *Zip Code* in another, for example.) That way, you can easily copy layouts from file to file. And then you can use any file as a lookup file, even if you didn't plan to originally.

When you duplicate a layout within a file, the parts are also duplicated. But when you copy and paste a layout to another file, only the fields are copied. So you'll need to reset the Header, Body, Sub-Summary, and Footer parts as needed.

Form and Function

You can create impressive forms with FileMaker II's built-in drawing tools, but those tools just don't have all the bells and whistles of a dedicated drawing program. For more complex forms, it's easy to bring the power of drawing programs to your database. First, create a complex form in an object-oriented program like MacDraw or SuperPaint's Draw layer. Copy the form to the Clipboard or Scrapbook and then paste it onto a blank FileMaker layout. Now you can superimpose your fields over the proper places.

Beware of placing fields on areas of the pasted-in image that have fill patterns. Fields are transparent, so the text in the field can get lost in the pattern. To make sure the field information is legible, you can leave appropriate white spaces while drawing the original form. Or, back in FileMaker, you can draw a white box the same size and shape as the field, position it on the pasted form, and then place the field on top of the white box.

Sticking to the Format

When creating layouts, you'll usually want the fields or layout text to have the same font sizes or styles. When you create a new field, it takes on the characteristics of

(continues)

Tom Negrino is a partner in Third Wave, an Apple value-added reseller. He also runs a Macintosh consulting business and is a member of the board of directors of the Los Angeles Macintosh Group.

the last field you clicked on. So before pulling the field tool onto the layout, click the cursor on a field with the font, size, style, and alignment you want the new field to have. Similarly, when using the text tool, click inside a text area whose characteristics you want to duplicate before you start a new text area.

Adding Definition

If you define a new field while on an existing layout, FileMaker adds the new field in its default font and size at the bottom of the layout. This is usually not where you want the field to be, and you have to reset the field's characteristics. You can avoid this by creating a "throwaway" blank layout. Go to this layout to make any new definitions. The new field will show up on the throwaway layout. You can then return to the intended layout and drag out the field using the field tool, formatting the field properly by using the above tip.

Keeping Order

FileMaker stores the records in a database in the order in which you entered them. When you use the Sort command, the program temporarily changes the order in which the records are presented. To permanently keep your database in a sorted order, first sort the file. Then clone the file (cloning a file makes a copy of the file with no records), and finally, using the Input From menu choice, import into the cloned file the records from the sorted file. FileMaker will use the sorted order that the records came in as the default. As you add new records, you can repeat this process to keep the file sorted.

Clandestine Finds

Often you'll want to do Finds on a particular field in a layout, yet you won't want that field to print. For example, you may want to find and print mailing labels for all the people who belong to a particular group without having to print the name of the group itself on the label.

One simple trick is to put fields you're likely to use for Finds to the side, out of the printing area. You can label them and it won't show on your printout.

Another technique is to use a script. Scripts, accessed through the Custom menu, tell FileMaker to reset the state of a file to what it was when the script was recorded and to perform one or more functions, such as switching layouts, doing finds or sorts, or printing. When you use a script, the field doesn't even need to be on the layout when you do a find. First you put the field on the layout. Do a find and (if desired) a sort, then create a script. After the script is set, go back to the layout and delete the field. The script still remembers the field and the criteria for the find and the sort, but the field no longer appears on your layout or when you print.

Name Your Layouts

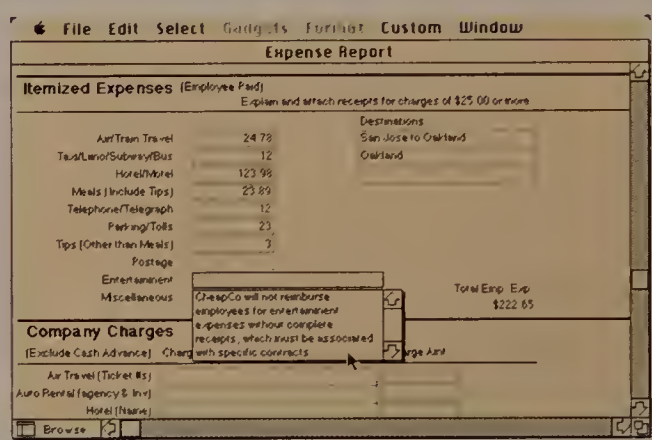
You can name particular layouts and switch to them automatically, without returning to the Layout mode. Simply switch to the layout while in Layout mode, then save the task as a script, and title the script with the name of the layout. The Scripts menu can become a list of layouts, making access easier and faster.

Chain Scripting

FileMaker lets you chain scripts together; the last function of one script can be to perform any other script. I have a script in a billing database that finds the records of just those clients with unpaid bills (you know who you are), sorts and prints them, then calls another script that performs Find All, so that my database ends up in its original condition.

Customized Helpers

You can use the pop-up entry lists in FileMaker as a unique, online, field-by-field assistance tool (see "Help on the Spot").



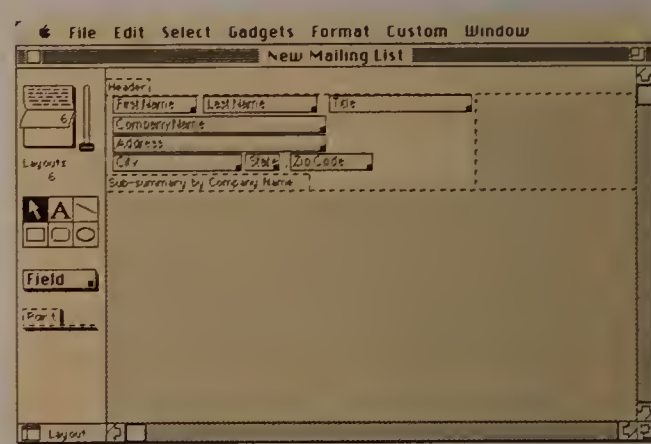
Help on the Spot
You can use FileMaker's list-of-values feature for field-by-field reminders or help.

Since the list-of-values entry box can hold up to 32K of text, it can be used to display information on how to fill out a particular data entry screen or form. This is especially useful if you use FileMaker across a network in a work group in which the users who enter the data don't necessarily design the database. Remember that the size of the pop-up box is determined by the size of the field it works with, so make sure you size your fields accordingly.

One to a Customer

To eliminate duplicate mailing labels, create a normal label layout but put a sub-summary part in place of the normal body line. Sub-summary parts will only show one value for duplicate data when your data is sorted by the key field. Add a "sub-summary when sorted by customer number" part or by any other key field that is able to group duplicates together. Then remove the body line and move the sub-summary part to exactly where the body line used to be (see "No Duplicates").

When you sort by the key field, FileMaker prints only one label for each sub-summary group. For this trick to work with two-up or three-up labels, you'll need to click on the Down First radio button in the Column Setup dialog box. If you select the default Across First radio button, FileMaker will only print one column, even if you specified two or three columns in the Column Setup box.



No Duplicates
Replacing the usual body line with a sub-summary part eliminates duplicate labels. Don't forget to sort on the key field first.

Looking Inside

FileMaker can look up data from another file, then use that data to fill out fields in the active record. The lookup function or option is triggered when what you type in a lookup field matches a value in a field in the lookup file. For example, you can type a customer account number and FileMaker will look in another file for

(continues)

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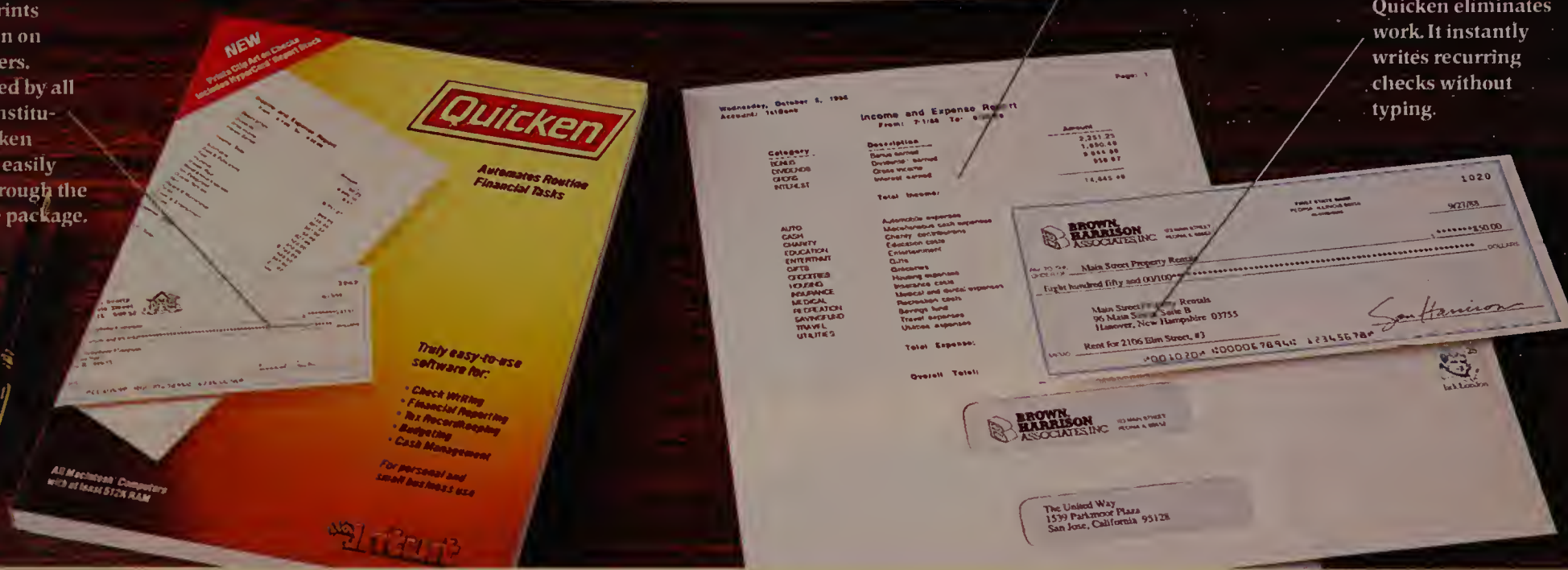

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Software Compatibility: Exports data in SYLK format for use in spreadsheets like Excel.* Exports data to HyperCard™
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Capacity: Unlimited number of bank accounts. Unlimited number of transactions. Unlimited number of income/expense categories. Maximum amounts to $9,999,999.99
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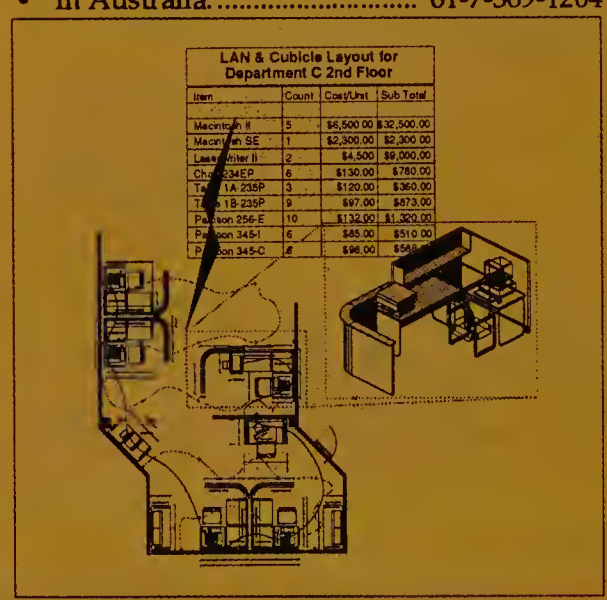

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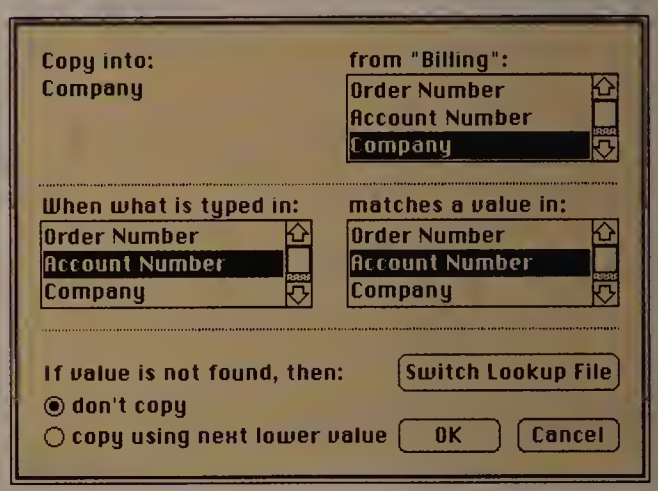
the record with a matching account number, then copy the name and address from the found record into the name and address fields of the record you're working on. This is a good feature but it requires two files; the working file and the lookup file.

You can avoid maintaining two files by getting FileMaker to look inside the current file and copy the desired information into fields in a new record. In this case, when you type the lookup trigger into the lookup field, the program searches all the records in the *active* file for a match. If a match is found, the data is pasted into the new record. Here's how it's done.

Go to the Define mode in the Select menu in the file you're using, and choose a field such as Company. Click on the Entry Options button, then click on the "Look up value from another file" check box in the resulting dialog box. When the usual file-selection box appears, select the name of the file in which you are working. The lookup definition dialog box appears, which lets you choose the fields you want copied (see "Look Inside"). Repeat this process for all other fields you want to be automatically filled in.



Look Inside

This is the usual lookup definition dialog box, but with a twist. The active file, Billing, is also selected as the lookup file. This allows you to use existing records in the same file for automatic data entry. In this case the company information is added into a new record whenever its account number matches that of an existing record.

Now, when you type in an account number that matches the account number in a previous record, FileMaker will copy the specified data from the previous record into one or more fields in the new record.

(continues)

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research scientist

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product analyst

Chris Shedenhelm
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Be careful that the field you use as the trigger value (in this case the account number) is unique; otherwise you could end up with unwanted data pasted into the new record.

Network Niceties

If a file is not being shared over a network, make certain the Exclusive command in the File menu is on (checked) to ensure maximum speed of all operations.

You can create a kind of runtime version of FileMaker II by designating the level of access for some users as "Browse records" and "Edit records" only. Such users will be able to add, modify, and delete records, but not to modify or design new layouts, fields, or scripts. If users need the database for reference only and will not make any changes, limit them to "Browse records." You can change access rights by choosing Password from the File menu, clicking on the New or Change button, and then selecting the appropriate access rights from the resulting dialog box.

Keyboard Crazy

Here are a few quick hints to help you utilize some of FileMaker's many keyboard shortcuts.

- When you tab through fields in existing records, FileMaker positions the insertion point at the end of the text already in the field. Rather than pressing Backspace repeatedly to delete the text, press Shift-Clear to clear the field.
- Pressing the Option key in conjunction with ⌘ key menu equivalents suppresses confirmation dialog boxes. For example, ⌘-Option-E deletes records without warning, so use this feature carefully.
- FileMaker lets you hide the book icon used to move between records, giving you more space for screen layouts. Click on the Screen Width icon at the lower-left corner of the screen to hide the book. Use the ⌘-Tab keys to move forward from record to record without using the icon. Pressing Shift-⌘-Tab moves you backward through the records.

Squeezing Your Data

Over time, as you add and delete records, a FileMaker database grows and takes up more disk space than its data actually needs. Using the Compressed copy option on the Save A Copy menu can dramatically reduce the amount of space a file takes up on the disk, which is especially important if you're using the program on a floppy-disk system. I squeezed a 463K database down to 328K using this feature. Two caveats, though: compressing a file can take quite a while; and you must be sure to have as much free space on the target disk as the size of the original database while the compressed copy is being created. FileMaker can compress a file in the background when running under MultiFinder, but the foreground application runs considerably slower than normal. Compressing a file also speeds many operations in large databases.

Sharing the Wealth

If you've found a shortcut or undocumented trick not mentioned here, spread the word to other *Macworld* readers by sending it to *Quick Tips, Macworld,* 501 Second St., San Francisco, CA 94107. □

See *Where to Buy* for contact information.

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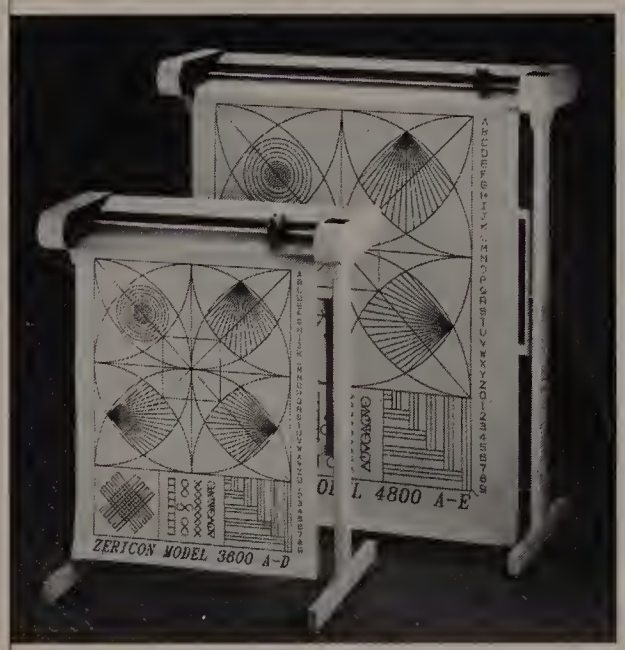

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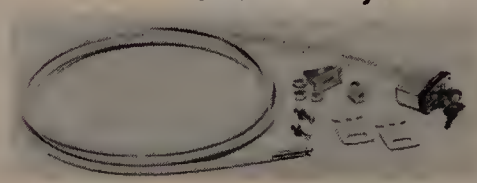

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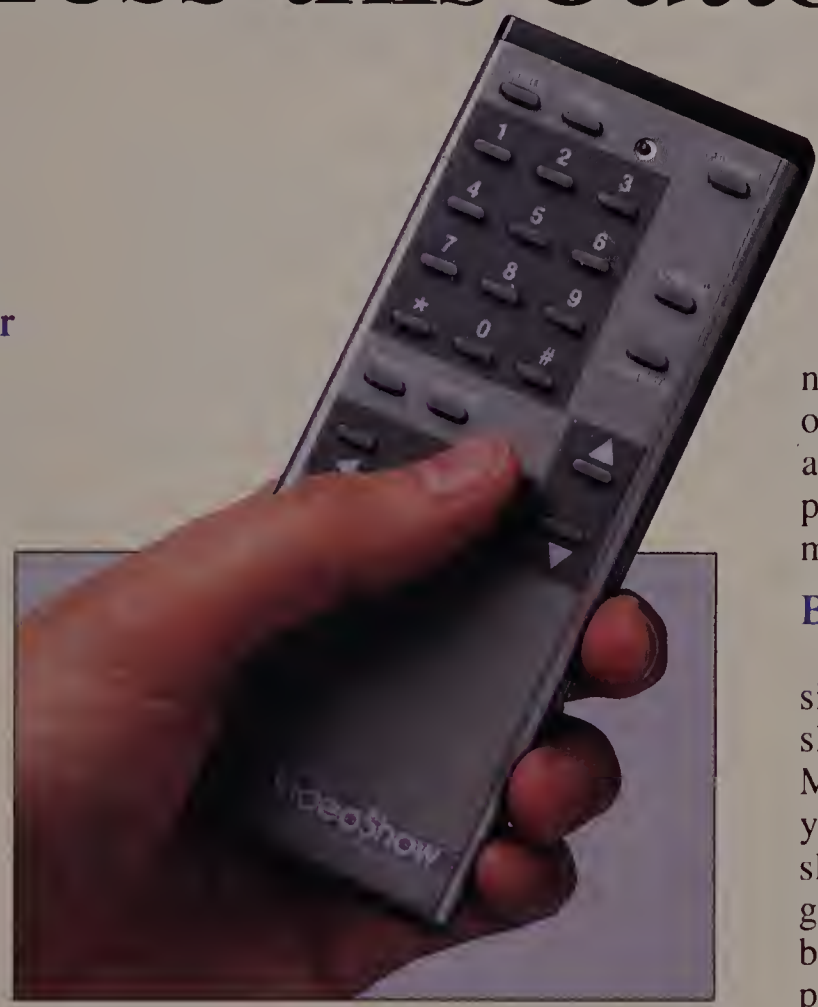

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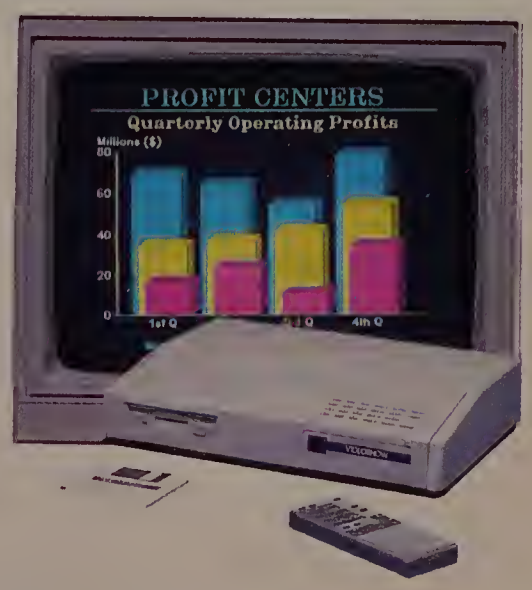

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Updates

This list brings you the highlights of software updates recently received but not yet tested. The first price is the upgrade cost for registered owners; the second is the current list price.

Aldus FreeHand version 2.0 supports color, has new fills and blending features for text and graphics. User interface has been changed to more closely resemble that of Aldus PageMaker. Contains Undo and Redo options and built-in color separator. Aldus, 411 First Ave. S, #200, Seattle, WA 98104; 206/628-6674. $85; $45 for extended technical support subscribers; $25 if originally purchased after September 14, 1988; $495 new.

FreeFlow version 3.0 works with AppleShare and TOPS LANs and is compatible with VAX-based software that emulates Macintosh LANs. Includes unlimited definition length, an element to diagram cross-reference lists, and the ability to define data structures for primitive elements. Automatically adds component dataflows to the dictionary when a definition is saved; has global rename and delete functions. Iconix Software Engineering, 2800 28th St., #230, Santa Monica, CA 90405; 213/458-0092. Free; $995 new.

HyperEngine Developer's Tool version 1.1 supports background commands and display of custom fonts and icons. Text is justifiable using buttons. This version incorporates all HyperTalk object abbreviations added to HyperCard. Symmetry Corp., 761 E. University, Mesa, AZ 85203; 800/624-2485. Free; $125 plus $5 s/h new.

Language Systems Fortran version 1.2 eliminates the size limit on single subroutines and the limit on number of Include files. Compiler has added feature that automatically breaks large programs into segments. Speed increase of approximately 5 percent overall; 20 percent for complex calculations. Language Systems, 441 Carlisle Dr., Herndon, VA 22070; 703/478-0181. $35 if originally purchased before September 12, 1988; $15 if originally purchased after; $345 including Macintosh Programmer's Workshop (MPW) new.

MacTell version 3.5 adds color support for the Mac II. Baseline, 838 Broadway, New York, NY 10003; 212/254-8235. $50; free if originally purchased after August 1, 1988; $97 new.

MarketMaster version II+ has profile screen, new sequencing of letters, revised help screen, online help, and can set up envelopes to run off LaserWriter or ImageWriter. Breakthrough Productions, 10659 Caminito Cascara, San Diego, CA 92108; 619/281-6174. $25; $295 for MarketMaster only; $395 with Results Analysis new.

Monte Carlo version 2.0 consists of Statistical Analysis, Simulation, and Long Term Projection modules. Makes producing statistics for up to 10 variables per model less complex than in previous version, and allows up to 100 variables per model. Actuarial Micro Software, 8025 N. Point Blvd., #215E, Winston-Salem, NC 27106; 919/773-1313. $45 if originally purchased before June 30, 1988; $60 after; $495 new until June 30, 1989; $595 after.

More II version 2.0 creates multiple-line headlines, previews pages in three views, has context-sensitive help feature, and produces a variety of tree charts. Supports multiple-monitor presentations and desktop film recorders. On-screen control panel is designed to monitor pace of live presentations. Symantec Corp., 10201 Torre Ave., Cupertino, CA 95014-2132; 408/253-9600. $89 plus $10 domestic s/h, $25 Canadian s/h; $395 new.

(continues)

Multi-User Appointment Diaries version 3.0.1 opens diaries on a network at up to 5 seconds faster than previous version. Has Week at a Peek and Month at a Peek features. Can print range of days, weeks, or months. Has Undo feature; supports color. Includes Smart Alarms version 2.9.1. Jam Technologies, 685 Market St., #860, San Francisco, CA 94105; 415/442-0795. $22 for 1 to 4 users with original disk; $199 for 1 to 4 users new (contact vendor for additional prices).

Read-It OCR version 2.0 allows you to scan pages directly from the scanner. Supports all Apple, H-P, Microtek-engine, and Cannon-engine scanners. Includes feature for type-table building; can do batch processing for files with different type tables. Olduvai, 7520 Red Rd., Ste. A, South Miami, FL 33143; 305/665-4665. $24 if originally purchased before November 1, 1988; $6 after that; $395 new.

Sales Associate version 1.10 has password protection, increased options for form letters, ⌘-key shortcuts. Program can load and save multiple form letters to disk. Performs searches 50 to 100 percent faster than earlier versions. Metropolis Software, 499 Hamilton Ave., #202, Palo Alto, CA 94301; 415/322-2001. Free; $395 new.

Smart Alarms version 2.9.1 includes one-hour snooze button on the DA, five-minute snooze button on the reminder dialog box. Compatible with System 6.0.2 and MultiFinder. Reminders can be printed; user controls when and how alarm beeps. Diary has Week at a Peek and Month at a Peek features; prints range of days, weeks, or months; and supports Undo and color. Jam Technologies, 685 Market St., #860, San Francisco, CA 94105; 415/442-0795. $12 with original disk; $99 new.

SmartScrap & The Clipper version 2.0 supports color and gray-scale in the Scrapbook, searches on individual Scrapbook pages, and has a lasso tool. Adds the ability to correct marquee selections pixel by pixel. Scrapbooks display individual names. Includes automatic scrapbook-building program. Solutions International, 30 Commerce St., Williston, VT 05495; 802/658-5506. $20; $89.95 new.

Talking Moose version 2.1 runs as an INIT file. Built-in utility program has phrase editor and exceptions editor so you can change the way specific words are pronounced. Has option to selectively turn off Moose's speech. Includes a game called Bird Race. Steve Halls, 3837 Luther Pl., #303, Saskatoon, Saskatchewan, Canada S7H 4B1; 306/374-6052. Free for owners of version 2.0; $20 new.

Think's Lightspeed Pascal version 2.0 has multipass optimizing compiler; supports Object Pascal for object-oriented programming. Handles any program size, contains language extensions for increased compatibility with Macintosh Programmer's Workshop (MPW). Symantec Corp., 10201 Torre Ave., Cupertino, CA 95014-2132; 408/253-9600. $49 plus $3.50 s/h; $149 new.

WriteNow version 2.0 performs mail merge in Microsoft Word–compatible format; includes dictionary; imports and exports direct text, MacWrite, and RTF (Rich Text Format) files. Includes full cursor-key support, fixed line spacing, and decimal tab; has the ability to change cases. Prints in forward or reverse direction. T/Maker, 1390 Villa St., Mountain View, CA 94041; 415/962-0195. Free if originally purchased after January 15, 1988; $50 if purchased before; $195 new. □

To have products listed in this section, send upgraded software, an outline of major changes since the previous release, upgrade price, suggested retail price, company name, mailing address, and phone number to Updates, Macworld, *501 Second St., San Francisco, CA 94107.*

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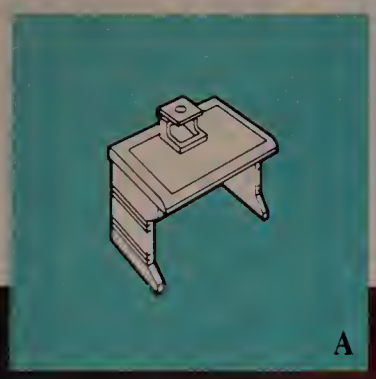
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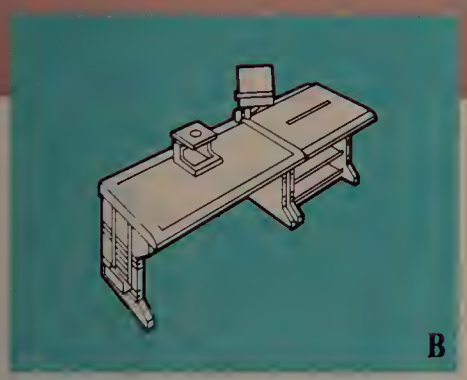
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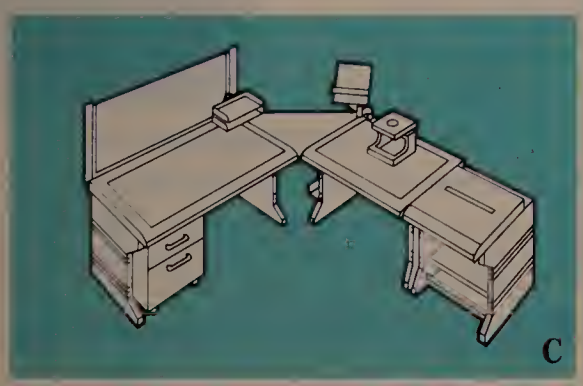
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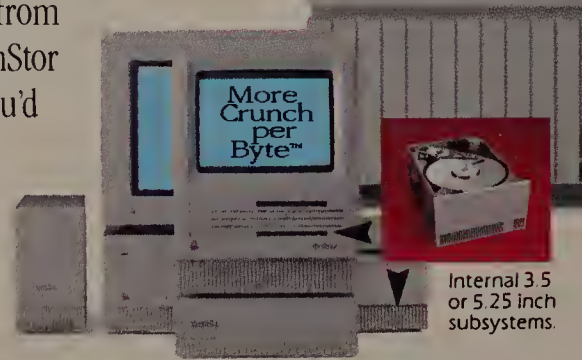

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Reader Service

A

751 **Adobe Illustrator 88.** Adobe Systems, Inc., P.O. Box 7900, Mountain View, CA 94039-7900; 415/961-4400, 800/833-6687.
752 **Alchemy.** Blank Software, 1477 Folsom St., San Francisco, CA 94103; 415/863-9224.
753 **Aldus FreeHand.** Aldus Corp., 411 First Ave. S, Seattle, WA 98104; 206/622-5500.
754 **AnyGraph.** Compatible Systems Corp., P.O. Drawer 17220, Boulder, CO 80308; 303/444-9532, 800/356-0283.
755 **AnyText.** Compatible Systems Corp., P.O. Drawer 17220, Boulder, CO 80308; 303/444-9532, 800/356-0283.
756 **Apple File Exchange.** Apple Computer, Inc., 20525 Mariani Ave., Cupertino, CA 95014; 408/996-1010.
757 **Apple Hard Disk 160SC.** Apple Computer, Inc., 20525 Mariani Ave., Cupertino, CA 95014; 408/996-1010.
758 **Apple Portrait Display.** Apple Computer, Inc., 20525 Mariani Ave., Cupertino, CA 95014; 408/996-1010.
759 **Apple Workstation Display.** Apple Computer, Inc., 20525 Mariani Ave., Cupertino, CA 95014; 408/996-1010.
760 **Apple PC 5.25 Drive.** Apple Computer, Inc., 20525 Mariani Ave., Cupertino, CA 95014; 408/996-1010.
761 **Arkanoid.** Discovery Software International, Inc., 163 Conduit St., Annapolis, MD 21401; 301/268-9877.

C

762 **Canvas.** Deneba Software, 3305 N.W. 74th Ave., Miami, FL 33122; 305/594-6965, 800/622-6827.
* **Chipendale.** True Basic, Inc., 12 Commerce Ave., West Lebanon, NH 03784; 603/298-8517, 800/872-2742.
763 **CLR StatCalculator.** Clear Lake Research, 5615 Morningside, #127, Houston, TX 77005; 713/523-7842.
764 **ConcertWare+.** Great Wave Software, Inc., 5353 Scotts Valley Dr., Scotts Valley, CA 95066; 408/438-1990.
765 **Cricket Draw.** Cricket Software, Inc., 40 Valley Stream Pkwy., Malvern, PA 19355; 215/251-9890.
766 **Cricket Paint.** Cricket Software, Inc., 40 Valley Stream Pkwy., Malvern, PA 19355; 215/251-9890.
767 **The Curator.** Solutions International, 30 Commerce St., Williston, VT 05495; 802/865-9220.

D

768 **Data Desk Professional.** Odesta Corp., 4084 Commercial Ave., Northbrook, IL 60062; 312/498-5615.
769 **DaynaFile.** Dayna Communications, Inc., 50 S. Main St., 5th Fl., Salt Lake City, UT 84144; 801/531-0203, 800/531-0600.
770 **DaynaFile Translation Software.** Dayna Communications, Inc., 50 S. Main St., 5th Fl., Salt Lake City, UT 84144; 801/531-0203, 800/531-0600.
771 **Deluxe Music Construction Set.** Electronic Arts, P.O. Box 7530, San Mateo, CA 94403; 415/571-7171, 800/245-4525.
772 **Different Drummer.** Primera Software, 650 Cragmont Ave., Berkeley, CA 94707; 415/525-3000.
773 **DiskExpress.** ALSoft, Inc., P.O. Box 927, Spring, TX 77383-0927; 713/353-4090.
774 **DX7 II/TX802 Editor/Librarian.** Opcode Systems, Inc., 1024 Hamilton Ct., Menlo Park, CA 94025; 415/321-8977.

E

775 **Excel Statistical Macro Package.** Heizer Software, 1941 Oak Park Blvd., #30, Pleasant Hill, CA 94523; 415/943-7667.

F

776 **The FileMaker Report.** Elk Horn Publishing, P.O. Box 126, Mountain View, CA 95004; 408/726-3148.
777 **FileMaker II.** Claris Corp., 440 Clyde Ave., Mountain View, CA 94040; 415/960-1500, 800/334-3535.
778 **Font/DA Juggler Plus.** ALSoft, Inc., P.O. Box 927, Spring, TX 77383-0927; 713/353-4090.
779 **FontDisplay.** Jeffrey Shulman, P.O. Box 521, Ridgefield, CT 06877-0521; 203/792-1521.
* **FontLiner.** Taylored Graphics, P.O. Box 1900, Freedom, CA 95019-1900; 408/761-2481.
780 **Fontographer 2.4.1.** Altsys Corp., 720 Avenue F, #109, Plano, TX 75074; 214/424-4888.
781 **FontSizer.** U.S. MicroLabs, Inc., 1611 Headway Cir., Bldg. 3, Austin, TX 78754; 512/339-0001, 800/552-7654.

G

782 **Gofer.** Microlytics, Inc., One Tobey Village Office Park, Pittsford, NY 14535; 716/248-9150, 800/828-6293.

H

783 **HB Music Engraver.** HB Imaging, 560 S. State St., Orem, UT 84058; 801/225-7222.
784 **HD20-WSI.** Personal Computer Peripherals Corp., 4710 Eisenhower Blvd., Bldg. A, Tampa, FL 33634; 813/884-3092, 800/622-2888.
785 **HyperCharger 020.** GCC Technologies, 580 Winter St., Waltham, MA 02154; 617/890-0880, 800/634-9737.

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* **Infinity 10.** Peripheral Land, Inc., 47800 Westinghouse Dr., Fremont, CA 94538; 415/657-2211.

J

786 **Jam Factory.** Intelligent Music, 116 N. Lake Ave., Albany, NY 12206; 518/434-4110.

* **Jam Session.** Brøderbund Software, Inc., 17 Paul Dr., San Rafael, CA 94903-2101; 415/492-3200, 800/527-6263.

K

787 **KCS Level II.** Dr. T's Music Software, 220 Boylston St., Chestnut Hill, MA 02167; 617/969-6657.

L

788 **LapLink Mac.** Traveling Software, Inc., 18702 N. Creek Pkwy., Bothell, WA 98011; 206/483-8088, 800/343-8080.

789 **Laser FX.** Postcraft International, Inc., 27811 Avenue Hopkins, #6, Valencia, CA 91355; 805/257-1797.

790 **LetraStudio.** Letraset USA, 40 Eisenhower Dr., Paramus, NJ 07653; 201/845-6100, 800/526-9703.

791 **LetrTuck.** EDCO Services, Inc., 12410 N. Dale Mabry Hwy., Tampa, FL 33618; 813/962-7800, 800/523-8973.

792 **Listen.** Resonate, Inc., P.O. Box 996, Menlo Park, CA 94026; 415/323-5022.

793 **LP Text.** London Pride, Inc., 1 Birch St., Norwalk, CT 06851; 203/866-4806.

M

794 **M.** Intelligent Music, 116 N. Lake Ave., Albany, NY 12206; 518/434-4110.

795 **MacADIOS.** GW Instruments, Inc., 35 Medford St., Somerville, MA 02143; 617/625-4096.

796 **Mac86.** AST Research, Inc., 2121 Alton Ave., Irvine, CA 92714-4992; 714/863-1333.

797 **Macintosh IIcx.** Apple Computer, Inc., 20525 Mariani Ave., Cupertino, CA 95014; 408/996-1010.

798 **Mac286.** AST Research, Inc., 2121 Alton Ave., Irvine, CA 92714-4992; 714/863-1333.

799 **MacKern.** ICOM Simulations, Inc., 648 S. Wheeling Rd., Wheeling, IL 60090; 312/520-4440.

800 **MacLink Plus.** DataViz, Inc., 35 Corporate Dr., Trumbull, CT 06611; 203/268-0030.

801 **MacLink Plus Translators.** DataViz, Inc., 35 Corporate Dr., Trumbull, CT 06611; 203/268-0030.

802 **MacSpin.** D2 Software, Inc., 5609-B Adams Ave., Austin, TX 78756; 512/454-7746.

803 **Master Juggler.** ALSoft, Inc., P.O. Box 927, Spring, TX 77383-0927; 713/353-4090.

804 **Master Tracks Pro.** Passport Designs, Inc., 625 Miramontes St., Half Moon Bay, CA 94019; 415/726-0280.

805 **MathType.** Design Science, Inc., 6475-B E. Pacific Coast Hwy., Long Beach, CA 90803; 213/433-0685.

806 **MGM Station.** Micro CAD/CAM, Inc., 5900 Sepulveda Blvd., Van Nuys, CA 91411; 818/376-0008.

* **Microsoft File.** Microsoft Corp., 16011 N.E. 36th Way, Box 97017, Redmond, WA 98073-9717; 206/882-8080, 800/426-9400.

* **Microsoft Works 2.0.** Microsoft Corp., 16011 N.E. 36th Way, Box 97017, Redmond, WA 98073-9717; 206/882-8080, 800/426-9400.

807 **MindWrite Express.** Access Technology, Inc., 200 Heritage Harbor, Ste. G, Monterey, CA 93940; 408/648-4000.

808 **Monte Carlo Simulations.** Actuarial Micro Software, 8025 North Point Blvd., #215E, Winston-Salem, NC 27106; 919/773-1313.

809 **Music Mouse.** Opcode Systems, Inc., 1024 Hamilton Ct., Menlo Park, CA 94025; 415/321-8977.

N

810 **NetBridge.** Shiva Corp., 155 Second St., Cambridge, MA 02141; 617/864-8500, 800/458-3550.

* **NS8/16 Memory Expansion Board.** National Semiconductor Corp., P.O. Box 58090, Santa Clara, CA 95052-8090; 408/721-5000, 800/538-8510.

O

811 **Orion SE.** MacPeak Systems, 1201 Spyglass, Austin, TX 78746; 512/327-3211, 800/225-7509.

812 **Orion II.** MacPeak Systems, 1201 Spyglass, Austin, TX 78746; 512/327-3211, 800/225-7509.

P

813 **PageMaker.** Aldus Corp., 411 First Ave. S, Seattle, WA 98104; 206/622-5500.

814 **Perfectstudy.** Powerware Systems, 755 N. 100 W, Orem, UT 84057; 801/224-5033, 800/336-6644.

815 **Performer.** Mark of the Unicorn, Inc., 222 Third St., Cambridge, MA 02142; 617/576-2760.

816 **P51 Mustang Flight Simulator.** Bullseye Software, P.O. Drawer 7900, Incline Village, NV 89450; 702/265-2298.

817 **Practica Musica.** Ars Nova Software, Box 40629, Santa Barbara, CA 93140; 805/564-2518, 800/445-4866.

* **Prodigy 4.** Levco, 6160 Lusk Blvd., #C-203, San Diego, CA 92121; 619/457-2011.

818 **Professional Composer.** Mark of the Unicorn, Inc., 222 Third St., Cambridge, MA 02142; 617/576-2760.

* **Pro-Tech Computer Paper and Film.** James River Corp., 356B Sewall St., Ludlow, MA 01056; 413/589-7592.

Q

819 **QMS ColorScript 100.** QMS, Inc., 1 Magnum Pass, Mobile, AL 36618; 205/633-4300, 800/631-2692.

820 **QuarkStyle.** Quark, Inc., 300 S. Jackson, #100, Denver, CO 80209; 303/934-2211, 800/356-9363.

821 **QuarkXpress.** Quark, Inc., 300 S. Jackson, #100, Denver, CO 80209; 303/934-2211, 800/356-9363.

822 **QuickShare.** Compatible Systems Corp., P.O. Drawer 17220, Boulder, CO 80308; 303/444-9532, 800/356-0283.

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824 **Radius Full Page Display SE Video Interface.** Radius, Inc., 404 E. Plumeria Dr., San Jose, CA 95134; 408/434-1010.
825 **Radius Two Page Display SE Video Interface.** Radius, Inc., 404 E. Plumeria Dr., San Jose, CA 95134; 408/434-1010.
826 **RATS.** VAR Econometrics, Inc., P.O. Box 1818, Evanston, IL 60204-1818; 312/864-8772.
827 **ReadySetGo.** Letraset USA, 40 Eisenhower Dr., Paramus, NJ 07653; 201/845-6100, 800/526-9703.
828 **Rembrandt II.** Jasmine Technologies, Inc., 1740 Army St., San Francisco, CA 94124; 415/282-1111.
829 **Roland D-110 Editor/Librarian.** Dr. T's Music Software, 220 Boylston St., Chestnut Hill, MA 02167; 617/969-6657.

S

830 **Scanmaster.** Howtek, Inc., 21 Park Ave., Hudson, NH 03051; 603/882-5200.
831 **Sequencer.** Opcode Systems, Inc., 1024 Hamilton Ct., Menlo Park, CA 94025; 415/321-8977.
832 **Sharp JX-450 Color Scanner.** Sharp Electronics Corp., P.O. Box 650, Sharp Plaza, Mahwah, NJ 07430; 201/529-8979, 800/526-0264.
833 **Smartmodem 2400 M.** Hayes Microcomputer Products, Inc., P.O. Box 105203, Atlanta, GA 30348; 404/441-1617.
834 **Sonata.** Adobe Systems, Inc., P.O. Box 7900, Mountain View, CA 94039-7900; 415/961-4400, 800/833-6687.
835 **Sound Accelerator.** Digidesign, Inc., 1360 Willow Rd., #101, Menlo Park, CA 94025; 415/327-8811.
836 **Sound Designer.** Digidesign, Inc., 1360 Willow Rd., #101, Menlo Park, CA 94025; 415/327-8811.
* **Spectrum/24.** SuperMac Technology, 295 N. Bernardo Ave., Mountain View, CA 94043; 415/964-8884.
837 **Speed Reader II.** Davidson & Associates, Inc., 3135 Kashiwa St., Torrance, CA 90505; 213/534-4070, 800/556-6141.
838 **StarDrive 60TX.** Ruby Systems, Inc., 188 S. Whisman Rd., Mountain View, CA 94041; 415/967-1187, 800/888-1668.
839 **StatView 512+.** BrainPower, Inc., 30497 Canwood, #201, Agoura Hills, CA 91301; 818/884-6911, 800/345-0519.
840 **StatView SE+Graphics.** Abacus Concepts, Inc., 1984 Bonita Ave., Berkeley, CA 94704; 415/540-1949.
841 **StatView II.** Abacus Concepts, Inc., 1984 Bonita Ave., Berkeley, CA 94704; 415/540-1949.
842 **Stepping Out II.** Berkeley System Design, Inc., 1708 Shattuck Ave., Berkeley, CA 94709; 415/540-5536.
843 **Studio Session.** Bogas Productions, 520 Cashew Ct., San Ramon, CA 94853; 415/829-2444.

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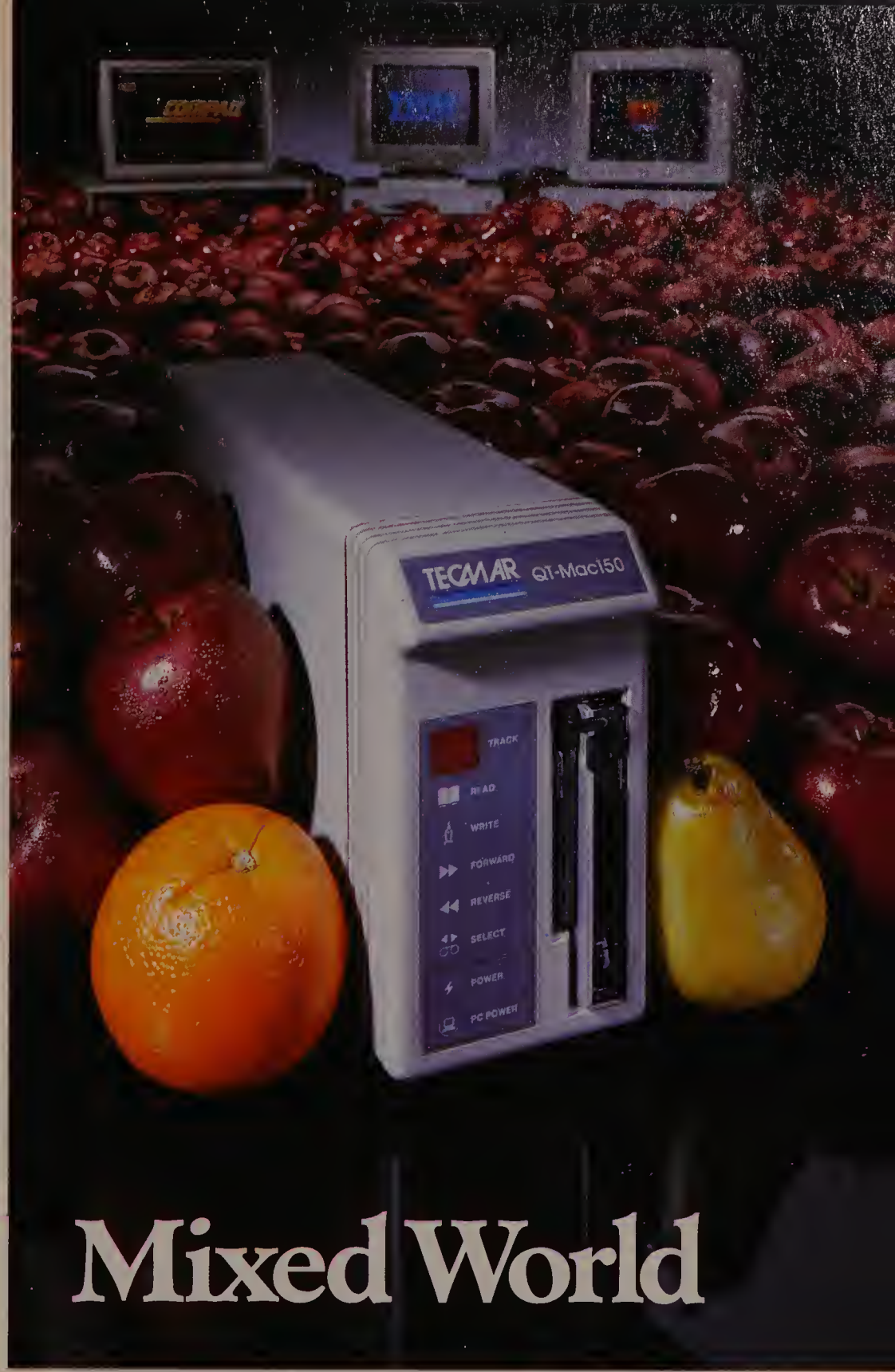

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845 **Super Jupiter Librarian.** Opcode Systems, Inc., 1024 Hamilton Ct., Menlo Park, CA 94025; 415/321-8977.
* **SuperLaserSpool.** SuperMac Technology, 295 N. Bernardo Ave., Mountain View, CA 94043; 415/964-8884.
846 **Symantec Utilities for the Macintosh.** Symantec Corp., 10201 Torre Ave., Cupertino, CA 95014; 408/253-9600.
847 **Systat.** Systat, Inc., 1800 Sherman, Evanston, IL 60201; 312/864-5670.

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848 **Tax Stacks.** StackWorks, Inc., P.O. Box 426, Urbana, IL 61801; 217/328-5257.
849 **33/030 Accelerator II.** DayStar Digital, Inc., 5556 Atlanta Hwy., Flower Branch, GA 30542; 805/388-2626, 800/622-6829.
* **TrueSTAT.** True Basic, Inc., 12 Commerce Ave., West Lebanon, NH 03784; 603/298-8517, 800/872-2742.
850 **Turbosynth.** Digidesign, Inc., 1360 Willow Rd., #101, Menlo Park, CA 94025; 415/327-8811.
* **TypeStyler.** Brøderbund Software, Inc., 17 Paul Dr., San Rafael, CA 94903-2101; 415/492-3200, 800/527-6263.

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851 **UpBeat.** Intelligent Music, 116 N. Lake Ave., Albany, NY 12206; 518/434-4110.

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852 **Voyager.** Carina Software, 830 Williams St., San Leandro, CA 94577; 415/352-7328.

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853 **Word Attack.** Davidson & Associates, Inc., 3135 Kashiwa St., Torrance, CA 90505; 213/534-4070, 800/556-6141.
854 **WriteMove.** GCC Technologies, 580 Winter St., Waltham, MA 02154; 617/890-0880, 800/634-9737.

X

855 **xFer.** Messenger Software, Inc., 20202 Center Ridge Rd., #5, Rocky River, OH 44116; 216/333-9936. □

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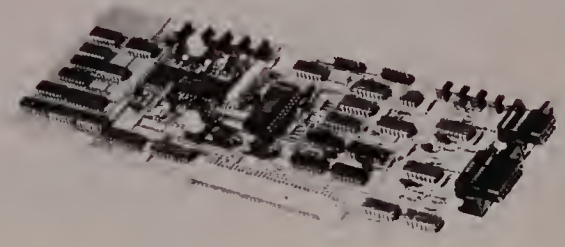

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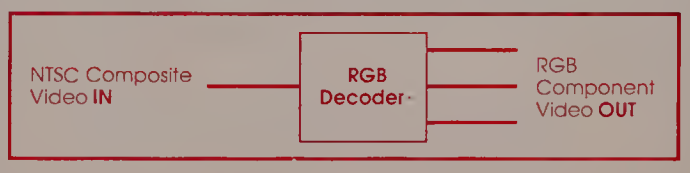

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The vendors and developers who advertise in the pages of **Macworld** share with us a common goal—to serve **you**, the consumer. And as a mail-order consumer, you have certain rights you should know and understand.

Mail-order sales must comply with the rules of the Federal Trade Commission (FTC) and various state laws. Here are some guidelines to alert you to your rights and help you shop by mail more effectively.

THE FTC MAIL ORDER RULES STATE:

1. The Seller must ship your order within 30 days of receiving it, unless clearly stated otherwise in the advertisement.

2. If the Seller cannot ship your order when promised, you must be notified in writing prior to the promised date. The notice must specify a new date if available, and must give you the opportunity to (a) cancel with a refund; (b) agree to a specified delayed shipping date; or (c) agree to an indefinite delay.

3. The Seller's notice must include a postage-paid reply envelope or card so that you may indicate your preference. If you do not respond, the Seller may assume you agree to the delay.

4. Even if you agree to an indefinite delay, you retain the right to cancel at any time before the merchandise has been shipped.

5. If you cancel an order that has been paid by check or money order, the Seller is obligated to mail your refund within seven business days. If you paid by credit card, the Seller must credit your account within one billing cycle following receipt of your cancellation. Store credits or vouchers are not acceptable in place of a refund.

6. If the item you order is unavailable, the Seller may not send you substitute merchandise without your consent.

DO'S AND DON'TS

By mail:

- Compare prices, including sales tax and shipping fees, before you order. Your purchase may be exempt from sales tax—check your state laws on collection regulations. Handling, packing, and shipping fees are legal and most states tax these services.
- State the precise specifications of the merchandise, such as model, make, size, component parts, etc.
- Confirm the price and expected delivery date as advertised.
- State on your order whether you will accept substitute merchandise if the item you specified is unavailable. If you won't accept a substitute, state that your payment should be returned.
- Record of payment is essential if a problem arises, so do not send cash.
- Keep copies of your order and all associated correspondence. Your records should include the company's name, address, and phone number; a description of the merchandise; your canceled check or money-order carbon; the date you mailed the order; and any sales slips and shipping receipts.
- Do not insure your order. It is the Seller's responsibility to make sure you receive your merchandise.

By phone:

- Note the name of the person who takes your order, and the time and date of your conversation.
- Make a record of your order, the price, promised availability, and the expected components.
- Save all correspondence, including your canceled check or money-order carbon and any written confirmation sent by the Seller.

Questions to ask:

- Does the advertised merchandise include all necessary parts and accessories? Are they made by the same manufacturer? Is the version number or model number the same? Is the product compatible with the hardware/software you intend to use it with?
- Can your order be shipped immediately? If not, when will it be available for shipping?
- Has the advertised price increased?
- What warranties does the merchandise carry? Who provides the service?
- What is the Seller's return policy? Exchange or repair? The refund policy?
- If a problem arises, with whom should you correspond?

PROBLEMS? SOLUTIONS:

1. If you do not receive your order as promised or if the merchandise is defective, write to the Seller immediately. Include a description of your order, the price, date, and account number or order number if available. Keep a copy of your letter.

2. If you register your complaint by phone, send a follow-up letter to confirm and keep a copy of it.

3. If you think the merchandise is defective, review your product instructions and warranty carefully. Make sure you expect only those features and abilities that the product is supposed to have. Then contact the Seller for procedures. Do not return the merchandise until you have been instructed to do so.

4. If you return the merchandise, keep the shipper's receipt or packing slip. Your right to reimbursement of postal costs is determined by store policy.

5. If you have discussed your problem thoroughly with the Seller and remain dissatisfied, write to the consumer complaint agency in the Seller's state. If you paid for the merchandise by credit card, you may have the right to withhold payment under the Federal Trade Commission's Fair Credit Billing Act.

Macworld believes that the customer has a right to product and service satisfaction. If you continue to experience problems with mail-order purchasing, the President of Macworld Communications and the Editor-in-Chief of Macworld want to know about it. Please take a moment to write to: Jim Martin, President, Macworld Communications, or Letters to the Editor, Macworld, 501 Second Street, San Francisco, CA 94107. You may also phone the President at 415-243-0505 to discuss your situation. Our goal is to help you become a satisfied mail-order consumer.

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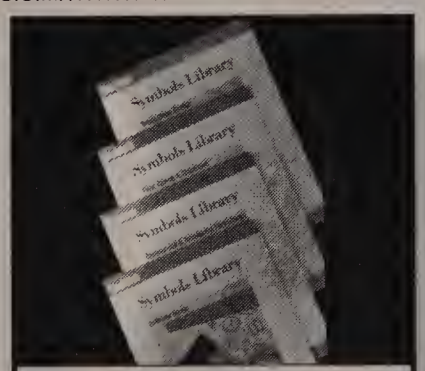

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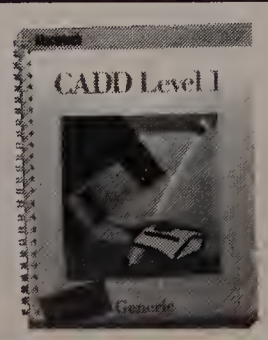

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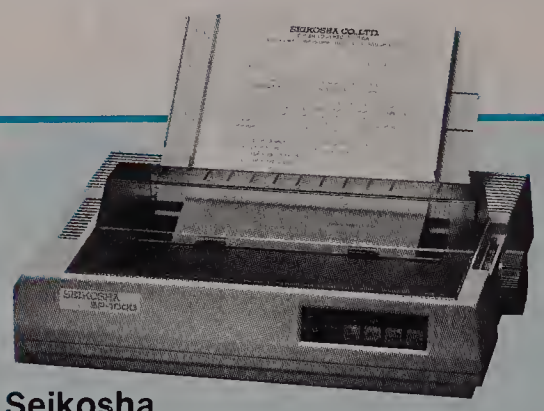

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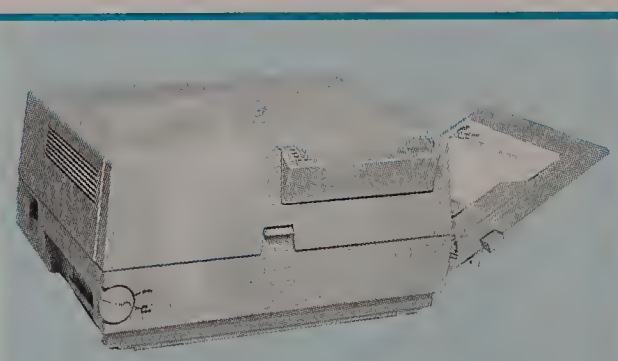

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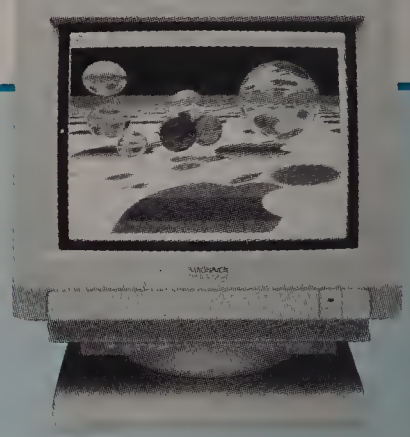

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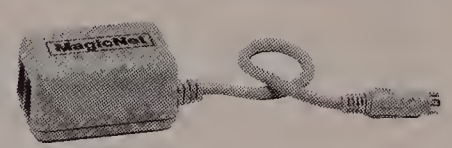

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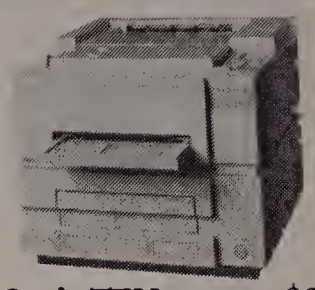

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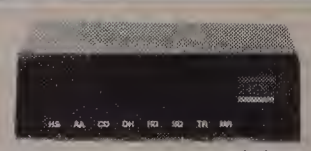

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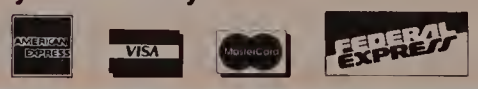

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The Macworld Catalog

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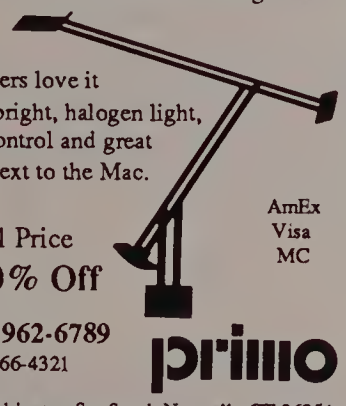

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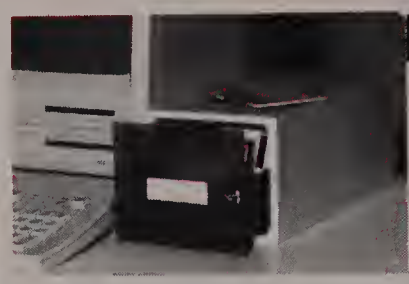

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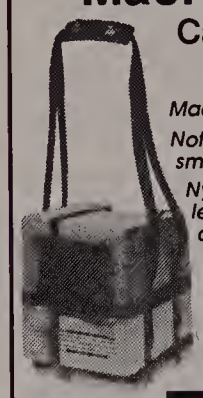

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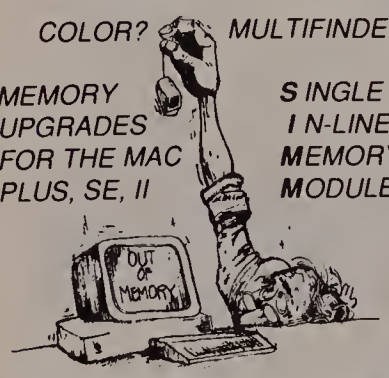

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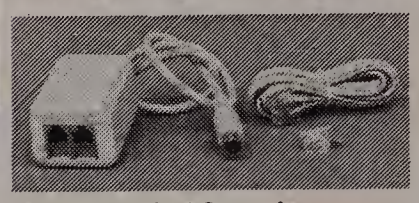
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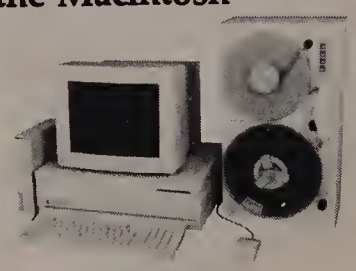
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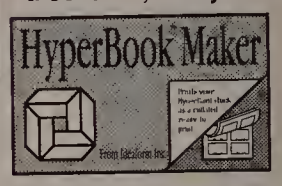
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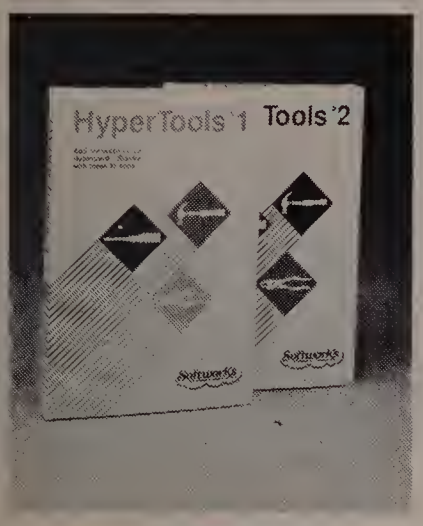

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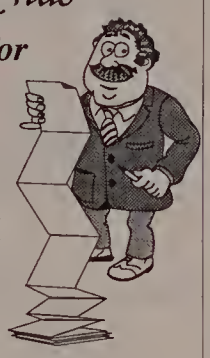

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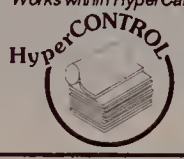

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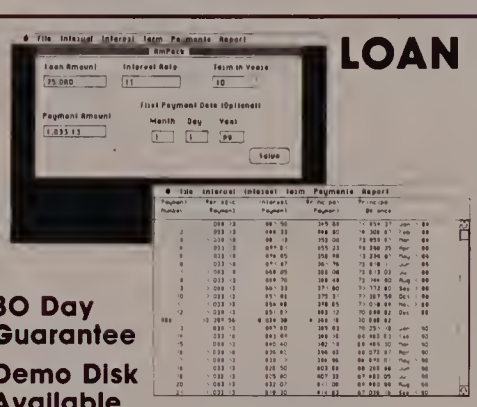

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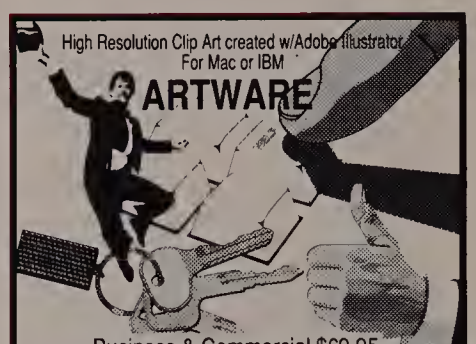

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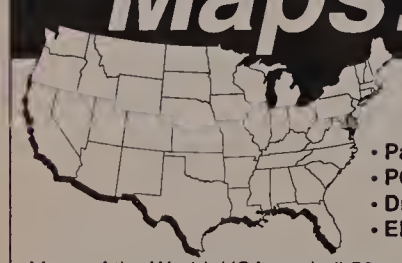

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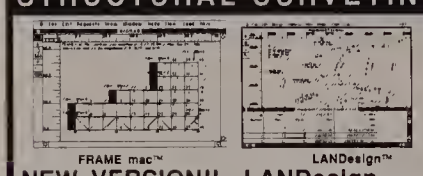

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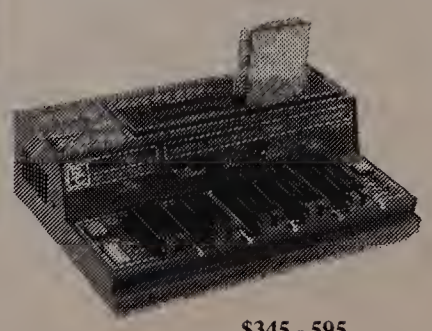

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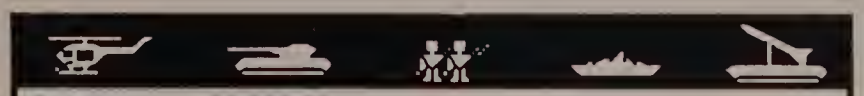

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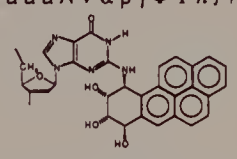

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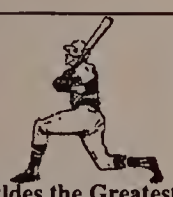

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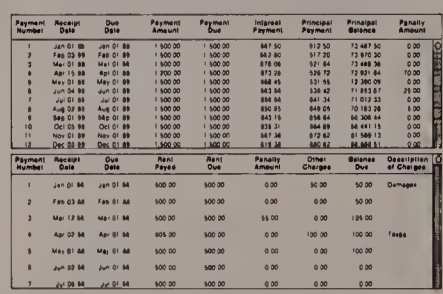

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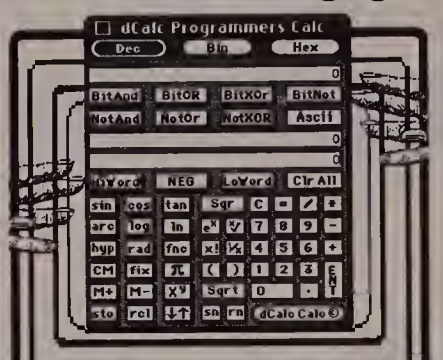

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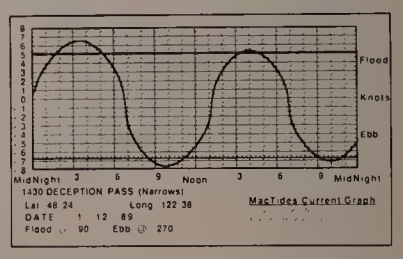

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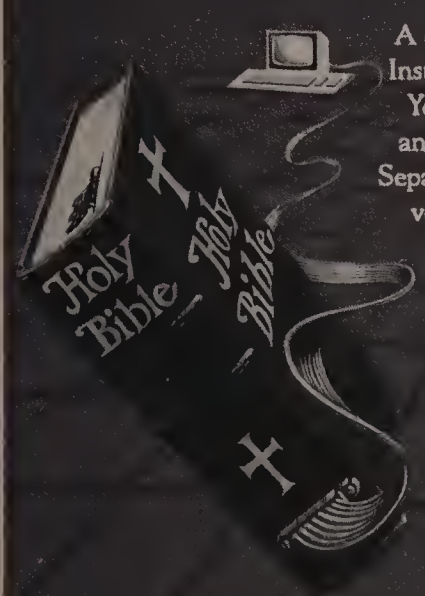

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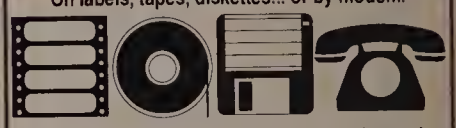

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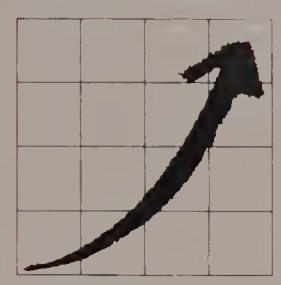

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MACWORLD EXPOSITION

Macworld Best-Sellers

Business Software

Months on chart	Last month	This month	
26	2	1	**Microsoft Works** *Microsoft*
47	1	2	**Microsoft Word** *Microsoft*
38	3	3	**Microsoft Excel** *Microsoft*
34	4	4	**PageMaker** *Aldus*
23	5	5	**MacWrite** *Claris*
6	10	6	**QuarkXpress** *Quark*
2	8	7	**FreeHand** *Aldus*
7	6	8	**WordPerfect for the Macintosh** *WordPerfect*
7	7	9	**Adobe Illustrator/Illustrator 88** *Adobe Systems*
36	–	10	**MacDraw** *Claris*

Education Software

Months on chart	Last month	This month	
1	–	1	**Where in the World Is Carmen Sandiego?** *Brøderbund*
14	1	2	**Reader Rabbit** *The Learning Company*
30	2	3	**Math Blaster** *Davidson & Associates*
27	4	4	**KidsTime** *Great Wave Software*
27	3	5	**Typing Tutor** *Simon & Schuster Computer Software*

Entertainment Software

Months on chart	Last month	This month	
29	2	1	**Flight Simulator** *Microsoft*
26	3	2	**Dark Castle** *Silicon Beach Software*
10	5	3	**Beyond Dark Castle** *Silicon Beach Software*
30	1	4	**MacGolf** *PCAI*
1	–	5	**Shufflepuck Cafe** *Brøderbund*

Networking/Data Communications

Months on chart	Last month	This month	
26	1	1	**TOPS** *TOPS*
22	4	2	**AppleShare** *Apple Computer*
17	3	3	**PhoneNet** *Farallon Computing*
30	2	4	**LocalTalk** *Apple Computer*
2	5	5	**MacLink Plus** *DataViz*

Hard Disks*

Months on chart	Last month	This month	
4	–	1	**SD Macstack 30** *CMS Enhancements*
14	4	2	**FX20** *General Computer*
4	–	3	**EMAC 20 External** *Everex*
22	–	4	**Apple Hard Disk 20SC** *Apple Computer*
3	–	5	**DataFrame 30/XP30** *SuperMac Technology*

Add-In Boards

Months on chart	Last month	This month	
17	1	1	**Radius Accelerator** *Radius*
4	3	2	**Radius Interface Display** *Radius*
4	4	3	**Mac286** *AST Research*
15	–	4	**Apple 1MB Memory Expansion Kit** *Apple Computer*
16	2	5	**Apple 2MB Memory Expansion Kit** *Apple Computer*

Product Watch

Editors' choice of other recent or forthcoming products of particular interest.

Adobe Streamline *Adobe Systems* tracing program that converts bitmaps to EPS files

Oracle for the Macintosh *Oracle Corporation* SQL database

Smart Art *Emerald City Software* library of PostScript text effects and graphics

Source: Exclusive InfoCorp survey of more than 125 Macintosh retailers and selected mail-order vendors. Covers sales during December 1988.

**Does not include hard disks installed at the factory.*

The WriteNow difference: *Ease, Performance, and...*

	WriteNow 2.0	MacWrite 5.0	MS Write	MS Word 3.01
Spelling checker size	**100,000 words**	100,000 words	80,000 words	80,000 words
Font size range	**4-127 pts.**	7-24 pts.	7-72 pts.	2-127 pts.
Maximum recommended document size (in pages)	**Over 2,000**	240	50	500
Number of open documents	**Unlimited ***	1	30	30
Mail merge	**Yes**	No	No	Yes
Number of editable, on-screen columns (WYSIWYG)	**4**	1	1	1
On-screen auto-numbering footnotes	**Yes**	No	No	No
Automatic repagination	**Yes**	Yes	No	No
Graphics in same line as text	**Yes**	No	Yes	Yes
Multiple headers and footers	**Yes**	No	No	Yes
Extensive Undo	**Yes**	No	No	No
Variable line spacing (in points)	**Yes**	No	No	Yes
Selective font, size, style, and ruler changes	**Yes**	No	No	Yes
MacUser Magazine's Best New Word Processor	**Yes**	No	No	No
Search for a word	**2.4** *sec*	7.6 *sec*	9.5 *sec*	9.7 *sec*
Spell Check document	**6.3** *sec*	2 *min* 34.0 *sec*	2 *min* 2.3 *sec*	1 *min* 48.0 *sec*
Copy & Paste large area	**6.8** *sec*	1 *min* 0.9 *sec*	12.4 *sec*	12.3 *sec*
Change font size of document	**10.7** *sec*	50.2 *sec*	17.6 *sec*	16.2 *sec*
Change font of document	**10.8** *sec*	37.1 *sec*	14.1 *sec*	15.2 *sec*
'Save As' a 12-page document	**3.6** *sec*	9.4 *sec*	20.3 *sec*	19.6 *sec*
Retail Price	**$195**	$125	$175	$395
Happy Users	***Yes***	?	?	?

* Number determined by Macintosh system constraints.

...*Happy Users!*

Our users love WriteNow—a claim our competition can't easily make for their products.

How do we know? Because our users tell us—on registration cards, on the telephone, on bulletin boards, and in letters.

We've heard dramatic stories about how WriteNow has significantly reduced training and support costs. And how clean, fast, and enjoyable it is to use. And how WriteNow got the job done when our competition sputtered.

You see, at T/Maker we feel a great word processor is more than just a stockpile of features. It's the *usability* of those features—how easy they are to learn and use, and how they *feel* under your fingertips when doing real work.

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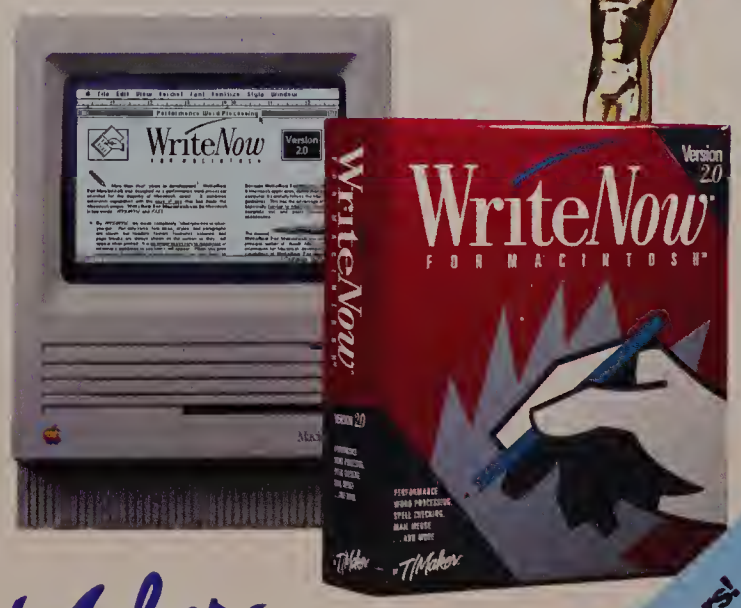
WriteNow 2.0 is *the* user's choice for best Macintosh word processor—*and we'll show anyone our customer registration cards to prove it!*



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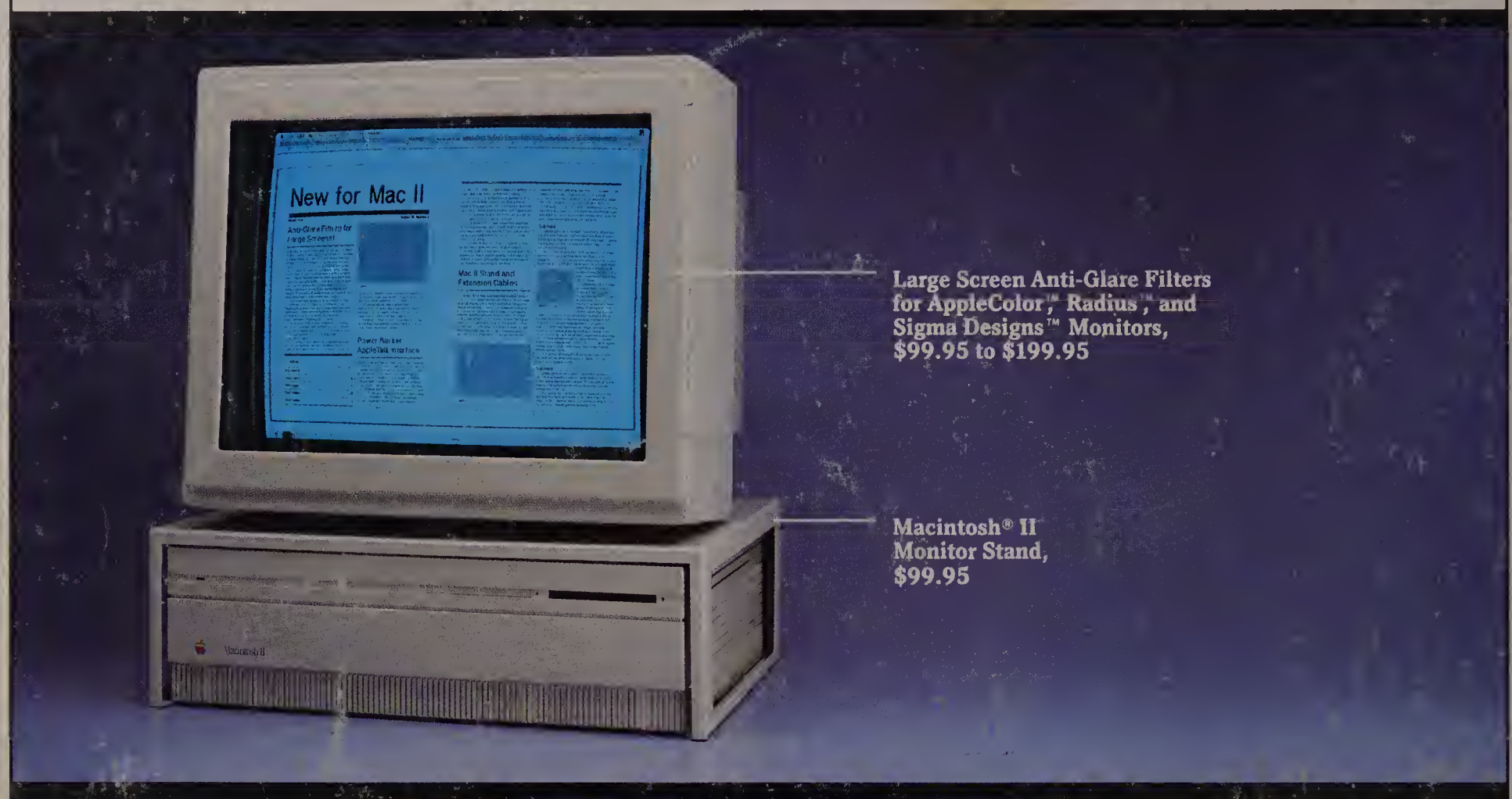

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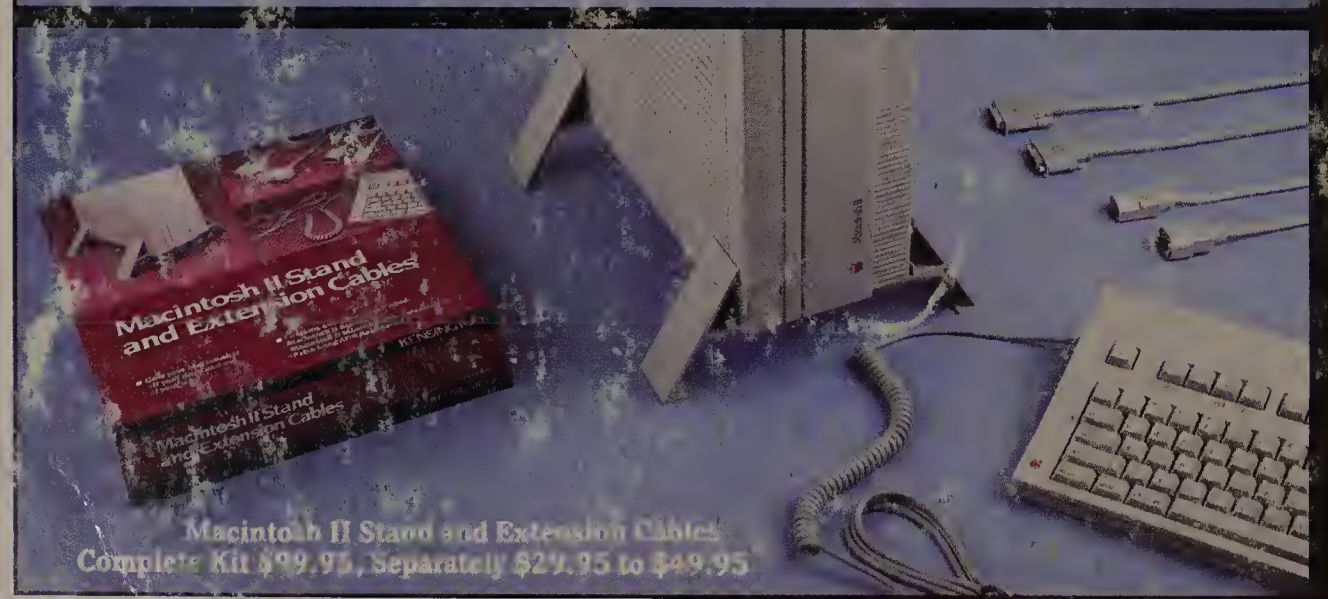

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